P6190.16A

PROGRAM IMPLEMENTATION PLAN
for
AUTOMATED RADAR TERMINAL SYSTEMS (ARTS) IIIE
A6.05/ARTS IIE A2.09
CIP # A-03 (formerly CIP # 32-04)
Solution Implementation Phase (Post ISD)

Available online at: http://ans.faa.gov

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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FOREWORD

This Program Implementation Plan (PIP) provides management direction, technical information, and guidance to all levels of the FAA involved in the implementation of the Automated Radar Terminal System (ARTS) IIIE A6.05 and ARTS IIE A2.09, from program inception through commissioning. Implementation of the ARTS IIIE A6.05 and ARTS IIE A2.09 fulfills part of National Airspace System (NAS) Plan Project #A-03, Common ARTS. Management responsibility for this project has been assigned to the Terminal Automation Integrated Product Team (IPT) AUA-300. Support and coordination with other agency organizations is essential for successful implementation.

The PIP is a living document that derives its value through the coordination, analysis and modification of the information contained within. Recipients of this PIP are asked to review it and to identify any perceived shortcoming or errors in the implementation process. Forward your comments directed to the Associate Product Lead for NAS Implementation.

As shown here in this Preface, text, which has been added or change will be printed in bold type.

Joe Kelfer
Existing Terminal Products
Team Lead, AOS-100

Jerry Trenholm (Acting)
Manager, NAS Transition Integration
Division, ANS-700

PRODUCT IMPLEMENTATION ASSESSMENT

The Product Implementation Plan (PIP) provides information to help assess the implementability of new system or service.

Your feedback is important to making appropriate adjustments to implementation strategies and plans

Please use this PIP to support your evaluation of the planned product implementation. Send your feedback to:

Don Roberts, Associate Product Lead for NAS Implementation (APLNI), ANS-700.

Requests for additional product information may also be directed to the APLNI. Your input and requests will be promptly addressed.

DOCUMENT CHANGE NOTICE (DCN)

1. Originator Name and Address Washington, D.C. ANS-700	2. [ ] Proposed [x] Approved	3. Code Identification P6190.16A	4. Standard No. FAA-STD-036
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This notice informs recipients that the document identified by the number (and revision letter) shown in block 4 has been changed. The pages changed by this DCN (being those furnished herewith) carry the same date as the DCN. The page numbers and dates listed below in the summary of changed pages, combined with non-listed pages of the original issue of the revision shown in block 4, constitute the current version of this document.

13. DCN No.	14. Pages changed	S*	A/D*	15. Date
	This is the initial issuance of the PIP.			1/24/97
Rev. A	Added and changed information is indicated within the document by bold type. Added or changed information is found in the following section: Foreword, i ,ii, iii, 1.1, 1.2, 1.6.1, 1.6.2, 6.2, 6.5.7, Fig. 4-4, 4-5 and Appendix C, D. Appendix F, G (added).	X	X	6/30/98

S* = Indicates Supersedes Earlier Page *A = Indicates Added Page *D = Indicates Deleted Page

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1.0 GENERAL

1.1 Purpose and Scope of Document

This Program Implementation Plan (PIP) presents overall guidance and direction for the implementation of the Automated Radar Terminal Systems (ARTS) IIIE A6.05 and ARTS IIE A2.09 program and the disposal of ARTS IIA excess equipment. The disposal of ARTS IIA resources has been authorized and will commence only after the respective ARTS IIE site has achieved Operational Readiness Date (ORD) and after the site Airways Facilities Manager has released all ARTS IIA assets. Detailed data contained in other documents such as the Integrated Logistic Support Plan (ILSP) have not been included in this version of the PIP, and they should be referenced for specific information. The PIP identifies program management, project implementation policy, responsibilities governing the activities of organizations, specific events, installation scheduling updates, and activities to be accomplished in order to implement the program.

The PIP is applicable to all levels and organizations of the Federal Aviation Administration (FAA) with responsibility for implementing the ARTS IIIE A6.05 and ARTS IIE A2.09 program. Information contained in this document reflects the status and planning as of the publication date. Updates will reflect evolution as management decisions occur.

1.2 Distribution and Revision

This document is distributed to the division level in the office of the Program Director for National Air Space (NAS) Automation, Air Traffic System Management, Air Traffic Plans and Requirements, NAS Transition and Implementation Service, Systems Maintenance Services; to branch level in the regional airway facilities, air traffic, and logistics divisions; to division level at the Mike Monroney Aeronautical Center and William J. Hughes Technical Center (WJHTC); and the airway facilities (AF) and air traffic (AT) field offices.

PIPs shall be issued when essential information related to implementation becomes available, changes or becomes better defined. The revision schedule is defined in the PIP based upon program unique circumstances and the acquisition cycle defined in FAA Order 1810.1.

Authority to change this PIP rests with the Product Team (PT) Leader for Terminal Automation Existing Products, AUA-320, and the Manager, Transition and Integration Division, ANS-700.

1.3 Definition of Terms

The following are definitions of terms to assist in reading the plan. Acronyms are defined in Appendix A.

Airway Support Facility: The combined physical structure, equipment, support systems, and functions which operate as a distinctive single entity to directly support the National Air Space (NAS) but not otherwise within the En Route or the Terminal Facilities programs.

Facility:ty is a combination of the following entities: (a) geographically defined building space (land, real estate, etc.), physical structure, and utilities that contain and support personnel

and/or equipment which provide NAS services; (b) personnel and/or equipment located in or on the physical structure; and (c) organizations, policies, and procedures employed or applied at a structure to perform a function of the NAS. For management and administration purposes, kinds of facilities may be organizationally grouped by function (such as en route, terminal, or airway support facilities).

Implementation: Those activities necessary to prepare the site, deliver, install, integrate and commission a new product into a facility or field environment. Implementation activities include program planning for implementation during early acquisition phases and extend through site and facility preparation for new or relocated systems and equipment, equipment installation and test, completion of all steps leading to full operational capability and facility commissioning. Implementation activities also include the removal of replaced equipment and the restoration/refurbishment of associated space and real property. Implementation activities during the system/equipment acquisition have been divided into phases and tied to key milestones incorporated in the Regional Tracking Program (RTP) activity networks. The phases are:

- Implementation Planning: The Implementation Planning phase spans the time prior to equipment installation and extends into the integration and testing of the new systems; there are ongoing program implementation planning activities.
- Site Preparation: The Site Preparation phase extends from the conduct of the site survey through the arrival of equipment/materiel at the deployment site. During the interval between these two milestones, all site preparation activities necessary for installation of the product/service at the deployment site are performed.
- Installation and Checkout (INCO): The INCO phase begins with delivery of project equipment at the site and continues through successful completion of testing of the equipment in the stand-alone mode. No FAA interfaces are integrated during this phase. The equipment contractor is normally responsible for installation activities and FAA personnel are in a monitor role. The INCO phase entails all activities associated with receipt and positioning of equipment, and testing product functionality in stand-alone mode. The milestone marking the end of this phase is normally the conclusion of Contractor Acceptance Inspection (CAI).
- System Integration: The System Integration phase begins when CAI is accomplished and concludes when the FAA declares Initial Operating Capability (IOC) for the system. During this phase, all FAA internal and external interfaces are established. The fully integrated functioning program equipment and systems are verified and operational responsibility for the system is transferred from the contractor to the FAA.
- Field Familiarization: The Field Familiarization phase extends from the IOC milestone through completion of the Operation Readiness Demonstration (ORD). During this interval, the technical and operational work forces and management personnel employ the new equipment in a carefully controlled operational environment to verify that the fully integrated system is performing within specified parameters. Use of the new system capabilities typically begins with use for limited periods of time during full traffic load conditions. During this time, site personnel develop full proficiency in the maintenance and operation of the newly configured operational system.

- Dual Operations: The Dual Operations phase occurs from ORD through completion of the Joint Acceptance Inspection (JAI). During this interval the system is commissioned and placed in operational use with the replaced system in back-up mode. The Dual Operations phase will not be applicable to all acquisition projects.
- Equipment Removal: Equipment Removal phase is the period when decommissioned equipment, implementation support equipment, and test equipment are removed, and FAA Facility and Equipment (F&E) data bases are updated to reflect the new configuration.

Implementation Issue: Any implementation problem for which an actionee and resolution suspense date has not been established within 30 days of its identification to the Product Team and/or the original resolution suspense date has been exceeded by more than 30 days.

Implementation Problem: Any missing essential elements of information or a discrepancy, conflict, or incompatibility in product plans or requirements which, if not resolved, could adversely impact product performance, product cost, or deployment and commissioning of the product to NAS service at one or more deployment sites.

Milestone: A significant event that marks the successful completion of a series of dependent activities resulting in definable program progress.

Operational State: The portion of the system/equipment life-cycle following the successful completion of site implementation.

Operations and Maintenance: The Operations and Maintenance phase of the acquisition process begins upon completion of the JAI and continues beyond implementation for the remainder of the system's life cycle. The Operations and Maintenance phase marks the achievement of full operational capability.

Personnel Certification: Personnel certification is a two-phase process consisting of a certification authority phase and a responsibility assignment phase. Certification authority requires FAA airway transportation system specialists to demonstrate knowledge of the theory of operations and the ability to practically demonstrate this knowledge. Certification responsibility is the official assignment to FAA airway transportation system specialists to use their authority to certify a specific service, system, subsystem, or equipment in the NAS.

Platform: A colloquial reference to a basic type of NAS facility that hosts the systems and subsystems necessary to perform an essential air traffic control function.

Product: A specific NAS system or a functionally congruent set of equipment acquired to satisfy an approved Mission Needs Statement. Usually acquired under the umbrella of an overall multi-product acquisition program.

Programed and funded effort designed to provide a new or improved capability in response to a validated need. A program may encompass more than one project and/or products.

Project: used to differentiate activities related to separately distinguishable products encompassed in an overall program.

Risk: A subjective assessment made regarding the likelihood of achieving an objective within a specified time and with the resources provided.

System Certification: Periodic verification and validation that the advertised quality and scope of services, and the capability of providing those services, are being provided to the users.

Traffic Management Unit: The personnel and hardware/software in the Air Route Traffic Control Centers (ARTCC) and designated Terminal Radar Approach Control (TRACON) responsible for direct involvement in the active management of facility traffic.

Transition: The aggregate of implementation activities for multiple programs (product implementation, facility modernization/expansion, etc) within a specific facility or field environment.

Transitory State: The period of time at a site during system/equipment acquisition from Pre-INCO through Equipment Removal.

1.4 Issues Identification, Tracking, and Resolution

There are several regularly conducted meetings to discuss and resolve Common ARTS implementation problems/issues. Problems are identified during the monthly ARTS IIE deployment teleconference, a weekly Common ARTS teleconference, or regular discussions with regional personnel. Minutes document the problems and an action item data base is maintained and updated monthly by ANS-700 implementation specialists. Problems exceeding the original resolution suspense date become an issue and are tracked through the ANS-700 monthly Issues Summary Report. IPT members accept responsibility for resolving all implementation problems/issues identified. Also, open discussions provide an opportunity to receive feedback from Lockheed Martin and the Program Office as well as share lessons learned.

A monthly In-Service Review (ISR) is conducted to define the managerial strategy to ensure the program is ready for integration. ARIG 96-2, Acquisition Reform Interim Guidance, provides the policy as well as the programmatic aspects of the FAA review to ensure the project is ready to be integrated into the NAS, and that the FAA is ready to receive, utilize and provide life-cycle support.

1.5 Contract Support

The ARTS IIIE contract was awarded to Lockheed Martin Federal Systems, Inc. September 1995, and ARTS IIE definitization occurred May 1996 with Lockheed Martin Federal Systems, Inc.

In addition to the efforts of ANS-700 and AUA-330, the following contractor support will be available for implementation and transition activities:

Contractor	Activity
ANS-700/NISC	Implementation activities: PIP, GSIP, Site Surveys, Field Assistance
AUA-330/NISC	Transition activities: Transition Plan, Site Surveys, Interdependencies
AUA-320/AUA TAC	Support to Product Lead on implementation issues
Field NISC Support	Implementation issues in the field
AUA-320/ASD SETA	Develop plans and schedules
ARU-200/NISC	Logistics activities: Equipment Removal/Disposal Plan, ILSP
AFZ-100/NISC	AF training activities

Table l-l Contract Support

1.6 Milestones

1.6.1 Implementation Phase

The ARTS IIE Upgrade Kit Site Implementation Schedule is provided in Appendix C. This milestone chart provides the timeline for key implementation activities for the ARTS IIE Kit based on the Deployment Site Operational System Test (DSOST) date.

The installation schedule for ARTS IIE is provided in Appendix D. This schedule is provided to the regions monthly to verify/confirm any changes.

The ARTS IIIE installation schedule information is available in Appendix E. The hardware installation and DSOST are complete at all five ARTS IIIE locations. Any additional ARTS IIIE locations will be coordinated with the appropriate region and organizations.

1.6.2 Key Program Milestones

The ARTS IIIE milestones chart is included in Appendix F and the ARTS IIE milestones chart is included in Appendix G. The schedules were current when this document was originally published; however, changes are likely as the program progresses. Schedule changes will be discussed during the regularly scheduled teleconferences and documented in the minutes discussed in paragraph 1.4.

2.0 AF OPERATIONS

2.1 Operational Workload Impacts

2.1.1 Transitory State

AF F&E personnel will be involved in all phases of Common ARTS site implementation and will oversee site installation activities.

AF personnel will be responsible for providing escort support during the physical site survey and site installation activities. The escort support activity will be conducted within the particular sites' regulatory practices. Procedures will be agreed upon during the site survey. (Source: Installation Planning Report for ARTS IIE Upgrade Kits ATC 61539, dated 8/13/97 and Installation Planning Report for ARTS IIE Systems ATC 61538, dated 11/22/95)

2.1.1.1 ARTS IIIE

New ARTS IIIE installations will replace existing ARTS IIIA equipment, i.e., Input/Output Processor Modification B (IOPB), Multiplexed Display Buffer Memory (MDBM), Disk Drive Unit (DDU), etc, with microprocessors. At existing ARTS IIIE A6.04 sites, the IOPB based Track Processor will be replaced with a microprocessor. The current A6.04 Micro Common Processor (MCP) and System Monitor Console (SMC) will be replaced with upgraded equipment. This new system will operate under the A6.05 baseline.

Site preparation by FAA F&E will include preparing space for 13 racks, including installing power and circuit breakers, cutting access holes, and floor mounting the cabinets supplied by the contractor. Preparation of site adaptation files is also an AF responsibility.

2.1.1.2 ARTS IIE

AF personnel will identify a technical on-site representative (TOR) to be responsible for the coordination and management of site specific activities, witnessing site acceptance testing, and signing acceptance documentation. A TOR package defining responsibilities and a designation letter will be provided to each TOR approximately six months prior to ARTS IIE installation.

A telephone site survey for upgrade kits will be conducted after the site receives and completes a data form from Lockheed Martin containing the current site survey information. The site survey form will be completed a minimum of three months prior to the kit installation date. Lockheed Martin, in cooperation with the TOR, will conduct a physical site survey for sites receiving ARTS IIE Systems at least 90 days prior to the scheduled installation date.

Installation of the ARTS IIE Upgrade Kit at all existing ARTS IIA sites will begin with a planning meeting to address all concerns and issues between the FAA and the contractor. This meeting will be followed by five consecutive nights of installation and two consecutive test periods. Appendix C provides a detailed schedule of activities during the ARTS IIE kit installation.

All ARTS IIE services will be available and certified for use each morning of the upgrade when the system is restored to ARTS IIA functionality. Availability of automation and radar service during those periods when modification work is being done will be contingent on the site configuration and availability of power to the various units in the acquisition processing cabinet (APC). Specifically, the availability of broadband video to the radar alphanumeric display subsystem (RADS) will be dependent on the site's method of distribution. Decoded beacon video will be available throughout the upgrade with the exception of the first night and ninety minutes of the second night. These are the periods when power is not applied to the acquisition signal conditioner (ASC) and decoding and data acquisition subsystem (DDAS).

At the conclusion of the hardware upgrade, the Common ARTS software will be loaded. An eight hour deployment system on-site test (DSOST) will be performed by the contractor with AOS-430 in attendance. Immediately following the DSOST a 72 hour confidence and stability (C&S) test will be performed by AOS-430 with support from the contractor. The TOR will be responsible for witnessing the acceptance testing and signing acceptance documentation.

Site AF technicians will be responsible for completing the site adaptation parameter process, including preparation of site adaptation files. Site AF technicians will also install the Digital Bright Radar Indicator Tower Equipment (DBRITE) key caps. (Source: Installation Planning Report for ARTS IIE Upgrade Kits ATC 61539, dated 8/13/97, and Installation Planning Report for ARTS IIE Systems ATC 61538, dated 11/22/95)

2.1.1.3 VTC Kit

Installation of the RADS Video Time Compression (VTC) upgrade kits will not require any system down time at the site. Disruption of site operation will be limited to the disconnection of a RADS console and the connection of its replacement unit.

Installation of the kit can be performed during normal operating hours and will be performed by the contractor concurrently with the APC upgrade. As each RADS console is completed, the next unmodified console will be taken out of service and replaced with the last modified console. This will continue until all RADS have been modified.

The following table shows the estimated time for the various upgrade tasks. These estimates are based upon average working situations and timely availability of equipment. Upgrade times may increase under less than normal situations.

Task Description	Estimated Time
Upgrade RADS power supply	4 hours
Install RADS relay kit	6 hours (includes pre-assembly time of 2 hours)
Install VTC modifications	8 hours (includes pre-test, update operations, and post test)

Table 2-1 VTC Kit Task Estimates

Each RADS will undergo a pre-test to verify the unit meets operational requirements and no physical damage to the cathode ray tube (CRT) has occurred. Any problems, such as CRT burn, will be documented prior to the start of upgrading to VTC. This test will not include photometric measurements. After each upgrade and installation procedure has been completed, the RADS unit will undergo an acceptance test operation to show the unit meets operational requirements. This test will be successfully passed prior to the next RADS upgrade operation; will not include photometric measurements. AF site implementation support will be required in the accomplishment of activities such as site preparations, inventory/system delivery, site installations, site acceptance test (SAT) procedures, realignment, and maintenance. (Source: Installation Planning Report for ARTS IIE Upgrade Kits ATC 61539 dated 8/1 3/97)

2.1.2 Operational State

There are no discernible changes to AF operations as a result of the system upgrades. (Source: ARTS IIIE ILSP, dated 2/12/97 and ARTS IIE ILSP, dated 3/26/97)

2.2 AF Procedural Changes

2.2.1 Hardware Maintenance

The FAA AF work force will be responsible for providing on-site hardware/system maintenance in accordance with FAA Order 6000.30B. Because the ARTS IIE and ARTS IIIE are composed of commercial off-the-shelf (COTS) equipment, the actual repair of failed line replaceable units (LRU) will be performed by the manufacturer. Site and depot-level maintenance will be performed by a combination of FAA AF work force, FAA Logistics Center (FAALC) work force, and interim contractor support (ICS) services. During early operations, field sites will be maintained by FAA personnel with ICS services provided by the prime contractor. As organic supply support and repair capabilities are developed, the depot level maintenance functions will be transitioned to the FAALC. (Source: ARTS IIIE ILSP dated 2/12/97)

2.2.2 Software Maintenance

Software maintenance responsibilities have been transitioned from AT to AF personnel under the auspices of the National Terminal System Engineering Division, AOS-400. Field level AF personnel will be responsible for such tasks as loading the program, installing national baseline and revision releases onto the hardware platform, and maintaining the data recording library. (Source: Air Traffic Services Operation Automation Responsibilities, Draft Order)
The National Terminal Operational Branch personnel will perform software maintenance and system troubleshooting for field sites by reviewing program trouble reports, preparing corrective actions, and conducting off-line tests. The corrective action is transferred to the ARTS IIA/ARTS IIIE Branch, AOS-430, via the Software Development System (SDS) for verification testing, incorporation into and distribution of a program revision. Air Traffic personnel will

identify site adaptation requirements for development and incorporation into the operational program by AOS-400. (Source: AOS-430, 7/19/97)

2.2.3 System Operations/Monitoring

These requirements are not applicable because ARTS IIIE/ARTS IIE sites do not utilize remote maintenance monitoring (RMM). The projected in service life-cycle of the program is ten years after Site Operational System Test (SOST) (Source: APML, April 19, 1996)

2.3 Regional F&E Role in Product Implementation

Regional F&E responsibilities include, but are not limited to, building preparations, storage, providing facility power, space, air-conditioning, communications access, and Government support equipment preparations. Table 2-2 provides F&E projected roles and manpower estimates for completion for ARTS IIE at an average site. (Source: ARU-200, January 12, 1997)

Site Implementation Phase	Activities	Position Type	Estimated Duration	No. of Personnel Required	Estimated No. Hrs per Person
Planning	Coordinate site installation schedule	RAPM/TOR	4 hours	1	4 hours
Site Preparation	Possible SMC pwr distribution circuit	ET/EE	8 hours	1	8 hours
INCO	N/A				
Integration	N/A				
Dual Ops	N/A				
Field Familiarization	N/A				
Equipment Removal	Remove existing equip	ET/EE	8 hours	1	8 hours

Table 2-2 Regional F&E Implementation

2.4 AF Operational/System Management Office (SMO) Role in Product Implementation

Systems maintenance responsibilities of AF personnel in ARTS IIIE A6.05/ARTS IIE A2.09 implementation include activities such as site preparation support, inventory/system delivery, site installations, SAT procedures, and support/maintenance of non-product equipment. The FAA headquarters is responsible for developing and monitoring the maintenance policy to be in effect for the equipment life cycle. Table 2-3 provides projected roles and estimated manpower for completion of these tasks for ARTS IIE and Table 2-4 provides the same information for ARTS IIE at an average site. (Source: ARTS IIIE ILSP dated 2/12/97 and ARTS IIE ILSP dated 3/26/97)

2.6.2 Personnel Certification

Both initial and recurring training will be provided under the ARTS IIIE A6.05 and ARTS IIE A2.09 program. System, subsystem, and equipment maintenance level training will be provided and personnel will be certified per the guidelines of FAA Order 6000.30B.
There are no personnel certification changes identified as a result of the implementation of ARTS IIIE A6.05/ARTS IIE A2.09.

3.0 AT OPERATIONS

3.1 Operational Workload Impacts

3.1.1 Transition State

3.1.1.1 ARTS IIIE System

ARTS IIIE A6.05 installation will occur during times a facility identifies as "minimal impact". The existing equipment (ARTS IIIA or ARTS IIIE A6.04) will be maintained in an operationally ready state to support continuing air traffic control (ATC) operations in the event of a failure of the ARTS IIIE hardware or software. (Source: ATO-120)

3.1.1.2 ARTS IIE System

Sites receiving a complete new ARTS IIE system will begin with a site survey held three months prior to system installation. Site adaptation and software system build will be performed by the OSF in coordination with the site. Installation is planned to require approximately eight days and will conclude with a Deployment SOST (DSOST) and 72 hour C&S Test.

Primary and secondary radar information will be available during the time the ARTS is off-line. Decoded beacon video will be available except the first night and approximately ninety minutes of the second night. After the 72 hour C&S test and certification is completed, controllers will have new functionality available. (Source: ATO- 120 and CDRL L007A, Installation Planning Report for ARTS IIE Systems, November 22, 1995)

3.1.1.3 ARTS IIE and RADS VTC Upgrade Kits

Installation of the ARTS IIE Upgrade Kit will be performed while the ARTS IIA system is off-line and will require a total of approximately 40 hours to complete. During the first day an initial meeting will occur to address concerns and issues of the FAA and contractor. The installation will be completed during five consecutive low density periods allowing for release of ARTS IIA. ARTS IIE acceptance will be performed upon the completion of the DSOST and C&S Test. (Source: Installation Planning Report for ARTS IIE Upgrade Kits, ATC 61539 dated 11/22/95)

The installation of the RADS VTC Upgrade Kit requires no system down time at the site. Disruption of site operation will be limited to the disconnection of a RADS console during kit installation. (Source: Installation Planning Report for ARTS IIE Upgrade Kits, ATC 61539 dated 11/22/95)

3.1.2 ATC Operational and Management Procedures

No airspace changes will be necessary.

Procedural changes will be required as the result of additional functionality being introduced in Common ARTS. ATC shall be trained and qualified on new procedures prior to transition. (Source: ATO-120)

3.1.3 Software Verification Procedures

ATR-300 responsibilities include:

- Provide input to Operational Test and Evaluation (OT&E) requirements
- Develop system shakedown requirements
- Assist in development of shakedown test plans and procedures
- Provide configuration management of operational software and off-line software (data reduction & analysis, training scenarios, etc.)
- Serve as a member of the Configuration Control Board (CCB)
- Conduct shakedown testing at test site and key sites
- Support ISR process
- Support Functional Configuration Audit (FCA) and Physical Configuration Audit (PCA)

Revised source code will be compiled and tested at the WJHTC by AOS-430 personnel prior to release. A scenario-driven baseline test plan will be run against all software revisions or new versions. Functional verification is conducted after successful baseline testing and prior to release to the field. Functional verification is conducted by AOS-430 for AT personnel (ARU, ATO). AT has approval authority to release the new functionality. Testing of software releases will be conducted by the field automation specialists and approval by site AT personnel will be secured prior to live operational use of the software. (Source: AOS-430)

3.1.4 Inter-facility Procedures

ARTS IIIE and ARTS IIE interfacility procedures will be changed to accommodate Common ARTS functionality. The Common ARTS functionality is described in detail in Section 4.4 of this document. (Source: ATO- 120)

3.1.5 Personnel Certification Procedures

Facility personnel will be trained and certified on ARTS IIIE and/or ARTS IIE functionality prior to cutover. Additional training schedules and information are provided in the ARTS IIIE and ARTS IIE ILSP. (Source: ATZ-110.7)

3.1.6 System Back-up/Cutover Procedures

3.1.6.1 ARTS IIIE

During the implementation phases of System Integration, System Shakedown, and Dual Operations, switchback to the existing ARTS IIIA or ARTS IIIE A6.04 system is normally planned after each test session. The ARTS III equipment will also be maintained in an operational ready state to support continuing ATC operations in the event of a failure of the ARTS IIIE A6.05 hardware or software.

3.1.6.2 ARTS IIE

After successful completion of DSOST and a 72 hour C&S test, the ARTS IIE system shall be declared operational. In the event of ARTS IIE equipment failure, the facility will revert to procedures previously used when the ARTS IIA failed. (Source: ATO-120)

3.2 Regional Office Role in Product Implementation

The primary role of AT personnel will be to validate ARTS functionality and coordinate the transition to Common ARTS. The Regional AT implementation role will be minimal.

3.3 Site AT Role in Product Implementation

3.3.1 ARTS IIE Site AT Role

Table 3-1 provides AT implementation roles and manpower estimates for ARTS IIE. The position type is identified as Automation Specialist (AUS), but sites where there is no AUS will have the activity conducted by personnel presently responsible for AUS duties such as procedures specialist, training specialist, supervisor, etc. (Source: ARU-200/ATO-120, 12/19/96)

Site Implementation Phase	Activities	Position Type	Estimated Duration	No. of Personnel Required	Estimated No. Hrs per Person
Planning	Controller Briefings	AUS	2 hours	1	2 hours
Site Preparation	* Adaptation Overview Course	AUS	40 hours	1	40 hours
INCO	Installation; DSOST	AUS	64 hours	1	64 hours
Integration	Shakedown;OT&E	AUS	40 hours	1	40 hours
Field Familiarization	Training	AUS; Supervisors Training Spec.	96 hours minimum	** 3-10 per facility	32 hours

* This training is not a part of the contractual obligations for AUS training. The training will be provided with FAA resources. **Number of AT personnel required will depend on staffing of supervisors at each facility. Familiarization includes full functionality of ARTS IIE.

Table 3-1 Site AT Implementation Roles (ARTS IIE)

3.3.2 ARTS IIIE Site AT Manpower Estimates

ARTS IIIE automation specialists are AOS personnel, eliminating participation in activities identified for ARTS IIE sites. At sites where there are no AOS or AUS personnel, the activity will be conducted by personnel presently responsible for AUS duties such as procedures specialists, training specialists, supervisors, etc. Table 3-2 provides manpower estimates for site AT roles in the implementation phases. (Source: ARU-200/ATO- 120, 12/19/96)

Site Implementation Phase	Activities	Position Type	Estimated Duration	No. of Personnel Required	Estimated No. Hrs per Person
Planning	N/A				
Site Preparation	Training	Training Specialist	16 hours	2	8 hours
INCO	N/A				
Integration	N/A				
Field Familiarization	Training	Supervisors Training Spec.	168 hrs min	*(7-15 per facility)	32 hours

* Number of Air Traffic personnel required will depend on staffing and supervisors at each facility. Familiarization includes full functionality of ARTS IIIE.

Table 3-2 Site AT Implementation Roles (ARTS IIIE)

3.4 Labor-Management Relations

The National Air Traffic Controllers Association (NATCA) will be informed about meetings and conferences and will be asked to review and provide comments on all documents that may impact the controllers' ability to accomplish their mission. (Source: ARU-200)

3.5 Flight Procedures/Standards

There are no flight procedures/standards changes introduced as a result of ARTS IIIE A6.05 and ARTS IIE A2.09. (Source: ATO-120)

4.0 SYSTEM CONFIGURATION

4.1 NAS Level Architecture

4.1.1 NAS Target State

ARTS IIE and ARTS IIIE upgrades are intended to be an interim solution until deployment of the Standard Terminal Automation Replacement System (STARS).

4.1.2 Life-cycle Projections

ARTS IIE/ARTS IIIE upgrades are enhancements to existing systems. Current life-cycle projections are through 2005 when STARS should be fully deployed.

4.2 Product Description

The ARTS IIE/ARTS IIIE are microprocessor-based distributed systems using COTS and existing ARTS hardware platforms. The system has a scaleable architecture that can range from a single central processor for small terminal systems to physically distributed systems for large terminal facilities. The common operational software baseline is site adaptable to support any size configuration at the ARTS IIE or ARTS IIIE sites. The national baseline software consists of a combination of ARTS IIE and ARTS IIIE functionality plus casefiles selected from the national patch library. Twelve major functions of the system are identified below. The last three functions are considered off-line functions or functions that apply to multiple processing areas.

- Surveillance and tracking (includes sensor input tracking, altitude tracking, intersensor linking, ground plane tracking, and real time quality control)
- Interfacility Data Transfer including flight plan (FP) maintenance
- Track/FP association/disassociation
- Conflict alert
- Minimum Safe Altitude Warning (MSAW)
- Controller display
- Controller input
- Monitoring and control
- Data recording
- Support/Maintenance
- Training (Enhanced Target Generator (ETG))
- RETRACK (ARTS IIIE)

The Common ARTS software is coded in ANSI C language designed to accommodate a range of configurations without changing the source code. The software uses the User Datagram Protocol (UDP)/Internet Protocol (IP) for communications within the system. This protocol allows the software to be independent of the physical configuration of the hardware subsystems. Inter-computer software configuration item (CSCI) communication may be by local area network (LAN) or between software CSCIs in a single processor.

For the ARTS IIIE sites, the system will be implemented as shown in Figure 4-1. Common processing, track processing, and system monitoring are implemented as separate subsystems

with triple redundant processing available in each of these subsystems. The display processing is comprised of the full digital ARTS display (FDAD), local and remote Digital Bright Radar Indicator Tower Equipment (DBRITE) and their associated processing elements. Dual redundant LANs interconnect these subsystems and provide for inter-subsystem communications.

The ARTS IIE sites will be implemented as shown in Figure 4-2. This implementation incorporates the track processing, common processing and system monitoring and control functions into a single System Processor (SP). Display processing includes the Display Network Interface Processor (DNIP) interfaced to the RADS and DBRITE with associated interface functions. The DNIP also provides beacon target inputs from the radar. For the ARTS IIE implementation, the inter-CSCI communications for common processing, track processing, and system monitoring are contained within the single SP. A single LAN provides communication between the SP and DNIP. Dual sensor and larger single ARTS IIE systems are configured with two SPs, two LANs, two DNIPs and two sets of other processing and Input/Output (I/O) elements operating as a single system. (Source: Hardware Detailed Design Document (HDDD), ATC 61041, dated 5/3/96)

4.3 Product Interfaces

The ARTS IIIE A6.05/ARTS IIE A2.09 program will interface with the NAS programs identified in the following paragraphs.

4.3.1 ARTS IIIE System Interfaces

- ARTCC
- Mode S Beacon Radar
- Airport Surveillance Radars (ASR) 7 and 8 via Sensor Receiver and Processor (SRAP)
- ASR 9 via Surveillance and Communications Processor (SCIP)
- Airport Traffic Control Beacon Interrogator (ATCBI) - 3/4/5
- Air Route Surveillance Radar -4 (ARSR-4)
- DBRITE (local and remote)
- Digital Altimeter Setting Indicator (DASI)
- Traffic Management System (TMS)
- WWVB External Real Time Clock (RTC)
- Performance Data Personal Computer (PD-PC) LAN
- Radar Display/Radar System Selector Switch (RSSS)
- Final Monitor Aid (FMA)

(Source: Hardware Detailed Design Document, ATC 6104 1, dated 5/3/96)

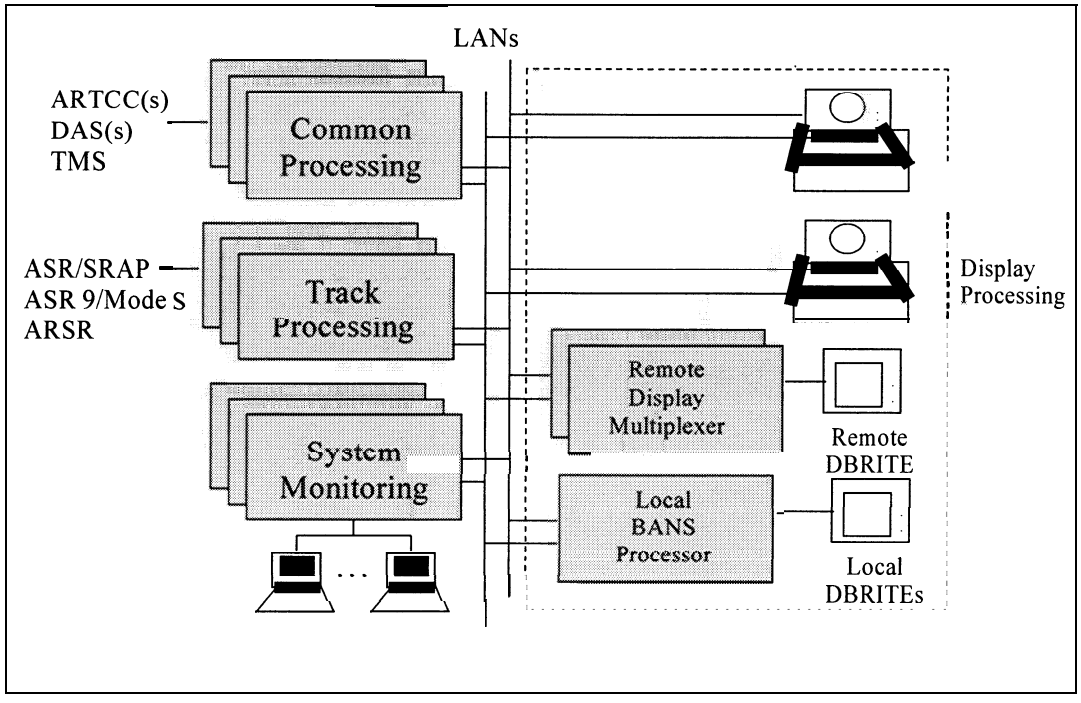


Figure 4-1 ARTS Implemented at ARTS IIIE Sites

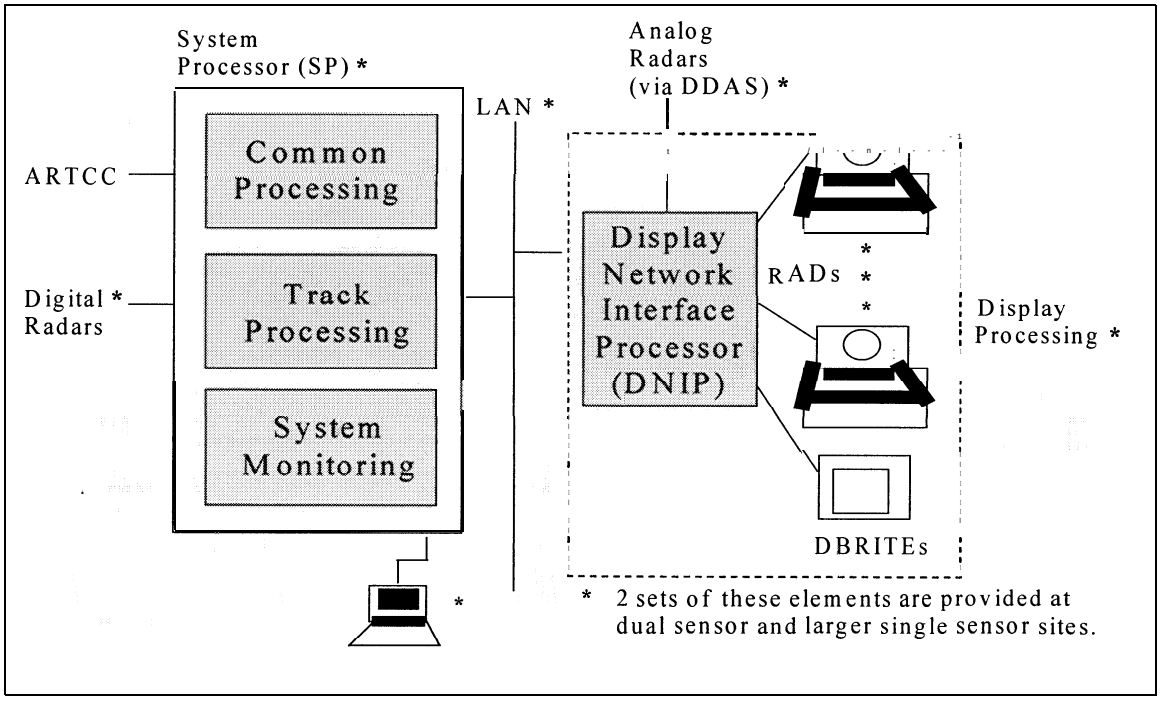


Figure 4-2 ARTS Implemented at ARTS IIE Sites

4.3.2 ARTS IIE System Interfaces

- ATCBI 3, 4, 5 via DDAS and Mode S
- ASR Radars - ASR-3, 4, 5, 6, 7, 8, and 9
- ARTCC
- Video Mappers
- DBRITE

4.3.2.1 ARTS IIE Kit

ARTS IIE kit components will be used to upgrade existing ARTS IIA systems to the ARTS IIE configurations. Major components upgraded include the LSI 2/40 to System Processor, Magnetic Tape to Disk System, and teletypewriter (TTY) to SMC PC. System upgrades will not impact existing interfaces.

VTC kit components will be used to upgrade existing ARTS IIA displays to the ARTS IIE configurations. Each RADS must be upgraded to facilitate the display of additional data due to Mode C Intruder (MCI). System upgrades will not impact existing interfaces.

4.3.2.2 ARTS IIE A2.09 System Installations

Sites being converted from ARTS IIA to ARTS IIE A2.09 configuration will replace existing hardware and software with the microprocessor based A2.09 system requiring interface to all the systems identified in paragraph 4.3.2.

4.4 Platform Architecture

Implementation of the ARTS IIIE A6.05/ARTS IIE A2.09 will deploy equipment into TRACONs and Terminal Radar Approach Control Tower Cabs (TRACAB). The deployed system configuration is dependent on the platform to which the system is being deployed. ARTS IIIE/A6.05 will be deployed to five TRACONs: Southern California, Denver, New York, Dallas/Fort Worth, and Chicago. ARTS IIE will deploy 142 kits and 7 systems; see Appendix D for locations and schedule.

4.4.1 Subsystem Level Architecture

This section identifies the hardware configuration items (HWCI) in the Common ARTS system and allocates the requirements to the selected HWCI. Paragraph 4.4.1.1 contains a more detailed description of each HWCI and provides the allocated requirements. (Source: Hardware Detailed Design Document, ATC 6104 1, dated May 3, 1996)

4.4.1.1 HWCI DEFINITION

The System Segment Specification/Hardware Requirements Specification (SSS/HRS) establishes the requirements for each of the Common ARTS HWCIs and its application to ARTS IIIE and/or ARTS IIE.

No.	Title	Acronym	System	Class**
1	System Monitoring Console Complex	SMCC	ARTS IIIE	MCOTS
2	Full Digital ARTS Display	FDAD	ARTS IIIE	STD
3	Remote Display Multiplexed	RDM	ARTS IIIE	MCOTS
4	Local Brite Alphanumberic Subsystem (BANS) Processor	LBP	ARTS IIIE	STD
5	Subsystem Interface Complex	SSIC	COMMON*	STD
6	Software Development Work Station	SDWS	COMMON*	OFFL
7	Support Equipment	SE	COMMON*	N/A
8	Track Processing Complex	TPC	ARTS IIIE	MCOTS
9	Common I Processing Complex	CPC	ARTS IIIE	MCOTS
10	Sensor Gateway	SG	ARTS IIIE	STD
11	SMC Personal Computer Complex	SMCPCC	COMMON*	MSUPP
12	Aural Alarm Control Unit	AACU	ARTS IIE	STD
13	Decoding and Data Acquisition Subsystem	DDAS	ARTS IIE	STD
14	Data Entry and Display Subsystem	DEDS	ARTS IIE	STD
15	System Processor	SP	ARTS IIE	MCOTS
16	Display and Network Interface Processor	DNIP	ARTS IIE	MCOTS
17	Input/Output Adapter	IOA	ARTS IIE	NEWD
18	Keyboard Device Controller	KDC	ARTS IIE	STD
19	Acquisition Processing Cabinet	APC	ARTS IIE	STD

* The HWCIs designated as Common in the above table are common to the ARTS IIIE and ARTS IIE systems. ** The following are definitions of the classification terms used in the above table: STD = Standard ARTS IIIA, ARTS IIIE, or ARTS IIE equipment; MCOTS = Mission critical off-the-shelf equipment; OFFL = Off-line equipment; MSUPP = Mission support equipment; NEWD = Newly developed equipment

Table 4-1 HWCIs

4.4.1.2 Hardware HWCI Descriptions

The remainder of this section provides a description of the major functions of each HWCI in the system.

4.4.1.2.1 System Monitoring Console Complex (SMCC\) - HWCI #1

The SMCC serves the functions of network maintenance, configuration control and reporting, system performance monitoring, and Continuous Data Recording (CDR) for the system. It consists of a network node configured for the recording of selected system data on a removable mass storage device. Winchester disks, a High-Speed Printer (HSP), and the Real-Time Clock (RTC) are also part of the SMCC.

4.4.1.2.2 Full Digital ARTS Display (FDAD) - HWCI #2

The FDAD provides the man/machine interface between an ARTS IIIE system and the air traffic controller. It is configured with an FDAD Display Processor (FDP). The FDP performs display

processing and provides the interface to the system via the SSIC. It consists of a general-purpose microprocessor, random access memory (RAM) and programmable read only memory (PROM), and it provides the capability to execute the ARTS IIIE display applications and diagnostic software associated with the FDAD.

The FDAD provides:

- Combined radar and computer-generated data presentation
- Operator-controlled and display selection
- Data entry capability
- Alternate selection of broadband and/or processed radar data.

4.4.1.2.3 Remote Display Multiplexer (RDM) - HWCI #3

The RDM provides the interface between the SSI (Network) and multiple Remote Display Buffer Memories (RDBM) or DBRITEs. It consists of a general-purpose microprocessor, RAM and PROM, serial interfaces to the RDBM or DBRITEs, and an interface to the SSIC. It provides the capability to execute the ARTS IIIE display applications and diagnostic software associated with the Remote DBRITEs. The RDBMs and Remote DBRITEs are external and are not part of this HWCI.

The RDM provides data processing for the displays at remote towers and sends change data for remote display refresh. It interfaces to the LAN directly and to the remote towers via an RS-232 modem.

4.4.1.2.4 Local BANS Processor (LBP) - HWCI #4

The LBP provides the interface between the SSI (Network) and the Local DBRITE. It consists of a general-purpose microprocessor, RAM and PROM, and interfaces to the SSIC and to the existing Local DBRITEs. It provides the capability to execute the ARTS IIIE display applications and diagnostic software associated with the Local DBRITE. The existing Local DBRITE equipment is not part of this HWCI.

The LBP provides display data processing for the Local DBRITE, interfaces the Local DBRITE to the LAN, and provides direct display refresh.

4.4.1.2.5 Subsystem Interface Complex (SSIC) - HWCI #5

The SSIC consists of the hardware required to implement the LAN including the network taps, transceivers, and LAN cables. The LAN provides for communications between the major subsystems in the ARTS IIIE and ARTS IIE systems. The ARTS IIIE network employs an operational and a maintenance LAN, each of which is redundant (4 cables total). The ARTS IIE network employs a single (non-redundant) operational LAN (1 cable) for single processor configurations. For ARTS IIE redundant processor configurations, the system employs an operational and a maintenance LAN, each of which is non-redundant (2 cables total). The LAN is an IEEE 802.3 standard implemented with commercially available hardware.

4.4.1.2.6 Software Development Work Station (SDWS) - HWCI #6

The SDWS HWCI is a set of equipment required to support software development. This includes equipment required to perform system modification, system build, and adaptation. This

HWCI is used in both ARTS IIIE and ARTS IIE systems. This HWCI will not be deployed to the field.

4.4.1.2.7 Support Equipment (SE) - HWCI #7

The SE HWCI encompasses all hardware required to support the ARTS system in the areas of diagnostics and repair, modification, system testing and verification support, field support, system special tools and test equipment, transition support, and environmental support. This HWCI includes, but is not limited to, the following types of hardware elements used in ARTS systems:

- Maintenance terminals (ARTS IIIE)
- Special installation kits and tools
- Transition switches and/or cables
- ATC equipment racks.

The configuration of this HWCI is largely dependent upon detailed design decisions and is configuration-controlled to the same level as the operational HWCIs.

4.4.1.2.8 Track Processing Complex (TPC) - HWCI #8

The TPC is microprocessor-based hardware including two hard disks and a floppy disk. The TPC elements supplied are the same as those which exist in the CPC. The TPC provides for the serial interfaces to the ASR-9, ARSR, and Mode S sensors, and performs the tracking function.

4.4.1.2.9 Common Processor Complex (CPC) - HWCI #9

The CPC is microprocessor-based hardware including two hard disks and a floppy disk. The CPC provides for the interface to the ARTCCs, the TMS, and DASI and performs all the common, centralized functions.

4.4.1.2.10 Sensor Gateway (SG) - HWCI #10

The SG provides target reports from the ASR-7 and ASR-8 radar sensors and the Air Traffic Control Radar Beacon System to the ARTS. The SG interfaces with the Sensor Receiver and Processor (SRAP) which receives sensor data, generates digitized target reports, and transmits them to the SG. SG then replaces the reports on the network for further processing and utilization.

4.4.1.2.11 System Monitoring and Control Personal Computer Complex (SMCPCC) - HWCI #11

The SMCPCC is a commercially available PC that includes a hard disk, floppy disk, CD-ROM, tape cartridge, and printer. The SMCPCC contains all of the components necessary to satisfy the requirements for performing on-line monitoring of the system and to support functions such as utilities and CDR editing. The SMCPCC is a common HWCI between the ARTS IIIE and ARTS IIE systems. The tape cartridge is provided for archiving of CDR data for the ARTS IIE systems. In the ARTS IIIE system, the SMCPCC includes a separate interface to a Performance Data PC (PD-PC) for collection and saving of performance data. (The same interface is used for Government Furnished Equipment (GFE) PCs.)

4.4.1.2.12 Aural Alarm Control Unit (AACU) - HWCI # 12

The AACU provides the circuitry to drive speakers for each display for the MSAW and Conflict Alert (CA) alarms. The alarm is software driven through the IOA HWCI. Each AACU can drive up to six speakers. The AACU is not part of the TRACON configuration when evaluating ARTS IIE system RMA requirements.

4.4.1.2.13 Decoding and Data Acquisition Subsystem (DDAS) - HWCI # 13

The DDAS is the ARTS IIE radar digitizer. The DDAS receives beacon analog video from Air Traffic Control Beacon Interrogator (ATCBI) 3-5 radars, ASR-9 SCIP, Mode S, or Mode S Beacon Video Reconstitutor, depending on the site configuration, and produces target replies. The target replies are converted to target reports by the Data Acquisition Device Control Processor (DADCP) and sent to the network via the IOA.

The DADCP is also part of this HWCI. The DADCP is a beacon-only digitizer. This HWCI also includes the Remote Control Box (RCB) which exchanges control, alarm, and indicator data with the DDAS and the beacon interrogator equipment, and the Code Select Box (CSB) which allows controllers to select up to ten non-discrete beacon codes for comparison with incoming data to the DDAS.

4.4.1.2.14 Data Entry and Display Subsystem (DEDS) - HWCI #14

The DEDS provides for:

- Radar Alphanumeric Display Subsystem (RADS) (includes a Keyboard/Positional Entry Module (PEM))
- Display Device Control Processor (DDCP)

There can be up to 11 DDCPs and RADS/DBRITEs in a single sensor ARTS IIE system, and 22 DDCPs and RADS/DBRITEs in a redundant processor ARTS IIE system.

The DEDS is the same as exists in the current ARTS IIA systems except the keycaps are replaced by AF personnel to be as similar as possible to the keycaps on the ARTS IIIE FDAD. The DEDS also includes modifications for Video Time Compression (VTC).

4.4.1.2.15 System Processor (SP) - HWCI #15

The SP includes a microprocessor, serial interface processors, chassis, two hard disks, and a floppy disk. The SP contains many of the same components as used in the TPC and CPC. The SP provides for the serial interfaces to the ASR-9/Mode S and to the ARTCC. The SP interfaces to the SSIC LAN. The SP interfaces to the SMCPCC via an auxiliary LAN interface. The SP performs all of the major ATC functions including tracking, MSAW, CA, flight plan association/disassociation, performance monitoring, and CDR.

4.4.1.2.16 Display and Network Interface Processor (DNIP) - HWCI # 16

The DNIP provides for the interface between the LAN and the ARTS IIE IOA. The DNIP is a commercially available board mounted in the ARTS IIE cabinet. The DNIP receives target replies and reports, and controller keyboard inputs from the IOA, and generates messages on the LAN. The DNIP also inputs display messages from the LAN, performs the display processing function, and outputs display data to the IOA for display on the RADS or DBRITE.

4.4.1.2.17 I/O Adapter (IOA) - HWCI #17

The IOA is located in the ARTS IIE cabinet and provides for the interface between the DNIP and the ARTS IIE expansion bus. The IOA includes a Device Controller Interface (DCI) which is the I/O expansion bus controller that directs data to and from the various device controllers and the DNIP, and provides for the output of alarm messages to the AACU. The IOA also includes the DNIP Adapter (DA) that allows the DNIP to be installed in the ARTS IIE cabinet on the I/0 expansion bus. DDAS target data (reports and replies) and RADS display and keyboard data are routed through the IOA.

4.4.1.2.18 Keyboard Device Controller (KDC) - HWCI #18

The KDC is classified as an ARTS IIE standard device that provides for control and input of up to 22 keyboard entries from up to 11 RADS or DBRITEs. The KDC interfaces to the system via the I/O expansion bus and the IOA.

4.4.1.2.19 Acquisition Processing Cabinet (APC) - HWCI #19

The APC HWCI is classified as an ARTS IIE standard device, this HWCI includes the following components:

- APC
- APC card rack
- Control panel
- Uninterruptible Power Supply (UPS)
- Fans
- Power supplies
- Cables and connectors
- Backup power supply
- Temperature sensors and alarms
- Level converters
- Network switches

4.4.2 Hardware Architecture

Both systems are open microprocessor-based distributed systems using industry standard COTS and existing ARTS hardware platforms. The ARTS systems employ a scaleable architecture which can range from a single central processor for small terminal systems to a physically distributed system for large terminal systems. Common operating software is scaleable and site adaptable to support any size configuration at ARTS IIIE and ARTS IIE sites. Figures 4-3 through 4-6 graphically describe the ARTS IIIE and three ARTS IIE systems respectively.

There are three types of ARTS IIE systems:

- ARTS IIE Single Sensor Configuration (SS/SP) supporting a maximum of 11 displays (Fig. 4-4),
- ARTS IIE Single Sensor Dual Processor Configuration (SS/DP) supporting a maximum of 22 displays (Fig. 4-5),
- ARTS IIE Dual Sensor Dual Processor Configuration (DS/DP) supporting a maximum of 22 displays with 2 sensors (Fig. 4-6).

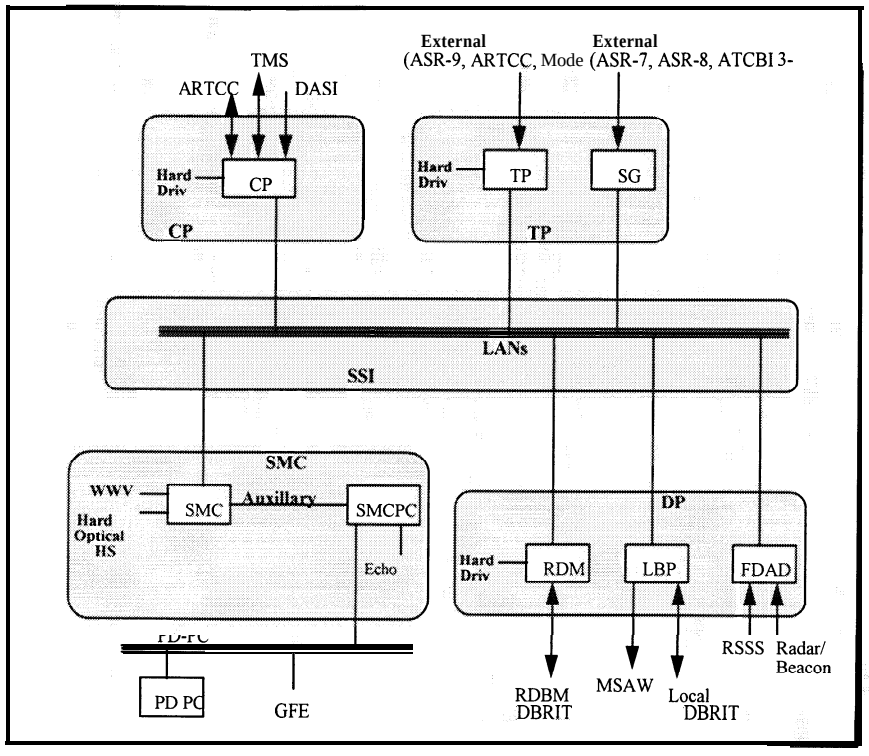


Figure 4-3 Subsystem Level Architecture for ARTS IIIE

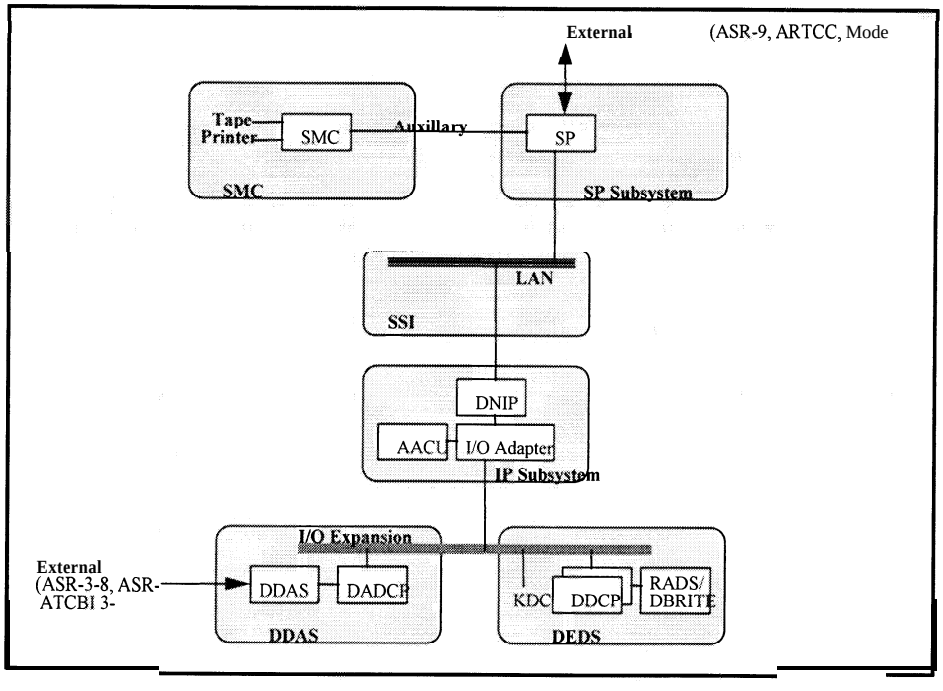


Figure 4-4 Subsystem Level Architecture for ARTS IIE Single Sensor

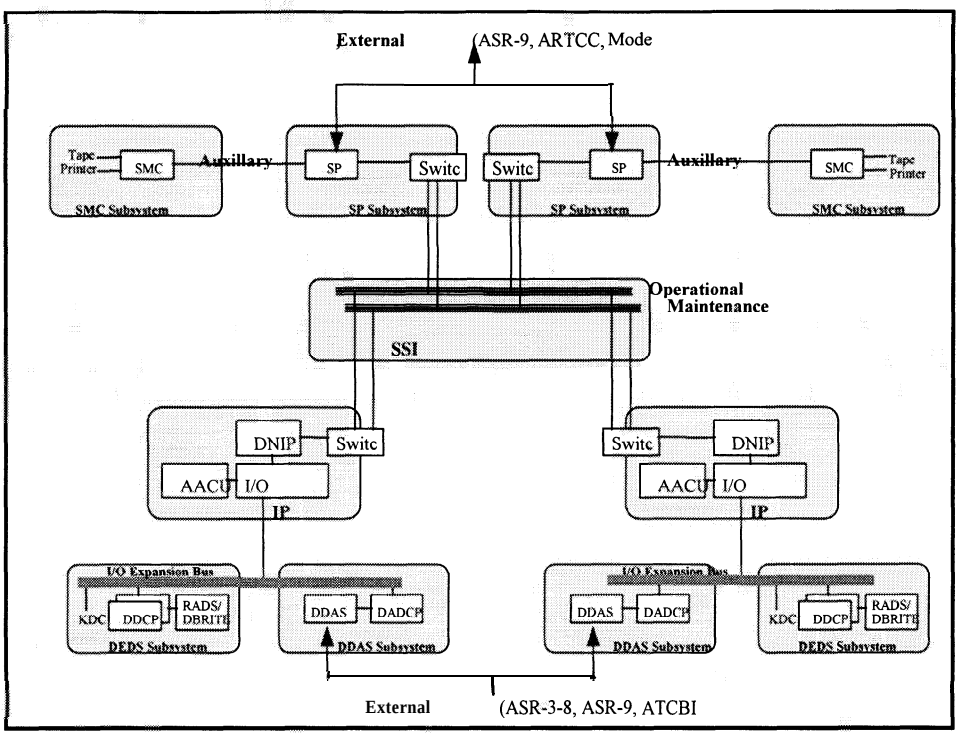


Figure 4-5 Subsystem Level Architecture for ARTS IIE Single Sensor Dual Processor

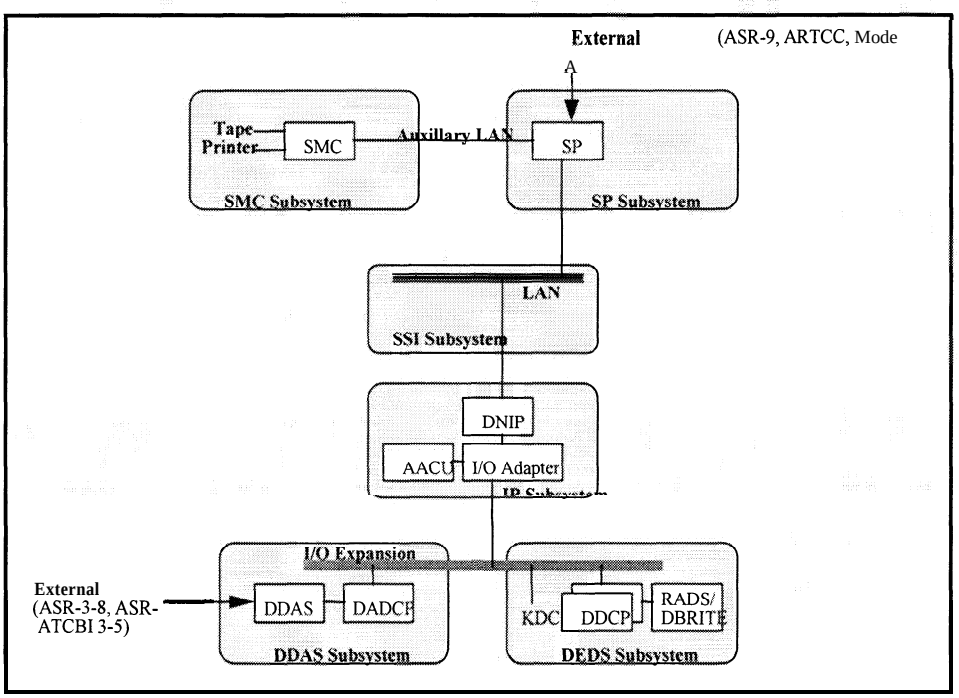


Figure 4-6 Subsystem Level Architecture for ARTS IIE Dual Sensor Dual Processor

4.4.3 Software Components

The Software Requirements Specification (SRS) establishes the requirements for each of the Computer Software Configuration Items (CSCI) of the Common ARTS system. These CSCI are listed in Table 4-2.

CSCI #	CSCI NAME	ACRONYM
1.	System Monitoring Software	SMON
2.	Display Processing Software	DPS
3.	Stroke Display Controller Software	SDC
4.	Subsystem Software	SSS
5.	System Console Software	SCS
6.	Maintenance Software	MAINT
7.	Track Processing Software	TPS
8.	Common Processing Software	CPS
9.	Site Adaptation Software	SADS
10.	Engineering Environment Software	EES
11.	Sensor Interface Software	SIFS
12.	Continuous Data Recording Editor Software	CDRES
13.	Display Device Controller Processor Software	DDCPS
14.	Data Acquisition Device Controller Processor	DADCPS

Table 4.2 Common ARTS CSCI

4.4.3.1 Software CSCI Allocation

The purpose of the ARTS program is to provide a common national software baseline for the ARTS IIIE and ARTS IIE programs.

The major CSCIs (TPS, CPS, and SMON) are intended to be transportable across the processing platforms within the ARTS systems. In the ARTS IIE systems, the TPS, CPS, and a portion of the SMON functions will reside together in the single SP. In the ARTS IIIE systems, these software CSCIs reside in each of the three redundant processors. The number of copies of the operating system required to control these CSCIs will be one per processor used. Communications among the CSCIs will be by means of User Datagram Protocol/Internet Protocol (UDP/IP) messages. These messages will be sent from one function to another, regardless of the physical allocation of the sending and receiving functions. If the sending and receiving functions are allocated to the same processor, the subsystem software will properly route the messages between the two without the use of network transmission. If the sending and receiving functions reside in separate processors, the subsystem software will route the messages over the network. This decision is transparent to the functions within the individual CSCIs, and thus, CSCI or function processor allocations may change with no change required to the software for various configurations.

4.4.3.2 Software CSCI Description

The remainder of this section provides a description of the major functions of each CSCI and of the role of each CSCI in the system.

4.4.3.2.1 System Monitoring Software (SMON)

The SMON CSCI provides the CDR, as well as the hard copy recording of status, alarms, alerts, and all actions affecting the system. The major functional areas of the SMON CSCI are:

- Monitor and Control
- Keyboard Message Processing
- Format Status and Response Data
- Data Recording
- Software Downloader
- RETRACK
- REPLAY

4.4.3.2.2 Display Processing Software (DPS)

The DPS CSCI provides keyboard and display processing functions for the FDAD Display Processor (FDP), RDM, LBP, and the RADS. This is accomplished by using the same CSCIs, operating in separate states for each HWCI. The major functional areas of the DPS CSCI are:

- Monitor and Control
- Track Data Base Management
- Track Display
- Tabular Display
- Keyboard Processing
- SDC Interface
- Local DBRITE Interface
- Remote DBRITE Interface
- RADS Interface
- Serial Interface

4.4.3.2.3 Stroke Display Controller (SDC)

The Stroke Display Controller (SDC) CSCI resides in the FDAD HWCI providing the software interface to that HWCI. The SDC operates in one of three states: an ARTS IIIA state, an ARTS IIIE state, or a Maintenance state. The major functional areas of the SDC CSCI are:

- Console Input Processing
- Keyboard Message Formatting
- Display Formatting
- FDP (ARTS IIIE) Communications
- Performance Monitoring

4.4.3.2.4 Subsystem Software SSS

The SSS CSCI includes the operating systems, and the interface and control software for inter-CSCI communications. The major functional areas of the SSS CSCI are:

- Subsystem Operating System

- Initialization/Recovery
- Performance Monitoring
- Communications Management

CSCI DESIGNATOR	HWCI DESIGNATOR
SMON	System Monitoring and Continuous Data Recording Complex (SMCC)
	System Processor (SP)
DPS	Full Digital ARTS Display (FDAD)
	Remote Display Multiplexer (RDM)
	Local BANS Processor (LBP)
	Display and Network Interface Processor (DNIP)
SDC	Full Digital ARTS Display (FDAD)
SSS	Subsystem Interface Complex (SSIC)
	Full Digital ARTS Display (FDAD)
	Remote Display Multiplexer (RDM)
	Local BANS Processor (LBP)
	System Monitoring and Continuous Data Recording Complex (SMCC)
	Track Processing Complex (TPC)
	Common Processing Complex (CPC)
	Sensor Gateway (SG)
	System Processor (SP)
	Display and Network Interface Processor (DNIP)
SCS	SMC Personal Computer Complex (SMCPCC)
MAINT	All HWCIs
TPS	Track Processing Complex (TPC)
	System Processor (SP)
CPS	Common Processing Complex (CPC)
	System Processor (SP)
SADS	SMC Personal Computer Complex (SMCPCC)
EES	Software Development Work Station (SDWS)
SIFS	Sensor Gateway (SG)
	Track Processing Complex (TPC)
	Display and Network Interface Processor (DNIP)
	System Processor (SP)
CDRES	SMC Personal Computer Complex (SMCPCC) or similar Equipment
DDCPS	Display and Entry Device Subsystem (DEDS)
DADCPS	Decoding and Data Acquisition Subsystem (DDAS)

Table 4-3 Common ARTS CSCI-TO-HWCI Mapping

4.4.3.2.5 System Console Software (SCS)

The SCS CSCI includes all software involved in the display of the System Monitor Console (SMON). The major functional areas of the SCS CSCI are:

- System Console Operating System
- Performance Data Recording
- Downloader Program

- Memory Readout
- Utility
- Maintenance Support
- PC Processing

4.4.3.2.6 Maintenance Software (MAINT)

The MAINT CSCI includes all non-operational software for support, diagnostic, and maintenance functions, including any which are newly developed or vendor furnished. No operational software is included within this CSCI. The major functional areas of the MAINT CSCI are:

- Equipment functional tests
- Diagnostics

4.4.3.2.7 Track Processing (TP)

The TP Software CSCI includes software allocated to the Track Processing (TP) subsystem. The major functional areas of the TPS CSCI are:

- TPS Track Processing
- TPS Track Update
- TPS Keyboard Processing
- TPS Performance Monitoring
- TPS Critical Data

4.4.3.2.8 Common Processing Software (CPS)

The CPS CSCI includes software allocated to the Common Processing (CP) subsystem. The major functional areas of the CPS CSCI are:

- CPS Flight Plan Processing
- CPS Intercessor Linking
- CPS Conflict Alert (CA)
- CPS Minimum Safe Altitude Warning (MSAW)
- CPS Keyboard Processing
- CPS Track Update
- CPS Performance Monitoring
- CPS Critical Data
- CPS RETRACK

4.4.3.2.9 Site Adaptation Software (SADS)

The SADS CSCI includes all of the non-operational software required to perform site adaptation of the ARTS system.

4.4.3.2.10 Engineering Environment Software (EES)

The EES CSCI includes all of the COTS development software for the SMC PC, the chassis, the DADCP, and the DDCP.

4.4.3.2.11 Sensor Interface Software (SIFS)

The SIFS CSCI includes all of the software involved in supplying the TPS with target rèport information, whether live or synthetic. The major functional areas of the SIFS CSCI are:

- SIF Surveillance Processing
- SIF Altimeter Setting Processing
- SIF Target Generator Processing

4.4.3.2.12 Continuous Data Recording (CDR) Editor Software (CDRES)

The CDRES CSCI fulfills all requirements for the data reduction and printing for CDR.

4.4.3.2.13 Display Device Controller Processor (DDCP)

The DDCP CSCI provides for the formatting of display symbology for the RADS. There is one DDCP per RADS, with a maximum of 11 DDCPs and RADS in each DEDS. This ARTS II firmware will be modified for ARTS symbology.

4.4.3.2.14 Data Acquisition Device Controller Processor (DADCP)

The DADCP CSCI provides the firmware to process beacon target replies for generation of target reports. It resides in the DDAS in an ARTS II environment.

5.0 PHYSICAL FACILITIES

Implementation of Common ARTS will not have major impacts on current ARTS IIA and ARTS IIIE facilities. New or upgraded equipment will fit in the same physical footprint or less. The equipment will require less power and create less heat than equipment being replaced.

5.1 Real Estate

Although some TRACONs are relocating into new facilities, there are no new real estate requirements associated with the implementation of either the ARTS IIIE A6.05 or ARTS IIE A2.09 systems.

5.2 Heating, Ventilation & Air Conditioning (HVAC)

5.2.1 HVAC Requirements

The ARTS IIE/ARTS IIIE equipment cooling requirements are as identified in Tables 5-1 and 5-2. As a result of the change from solid state to microprocessing technology and the concomitant reduction in power usage, the HVAC in existing facilities will be adequate. The FAA is responsible for inspecting the facility air conditioning system to determine its capability. Wherever the capability is discovered to be inadequate, the system's capacity should be increased to the extent necessary to create and maintain the temperature and humidity of the Equipment Room, Instrument Flight Rules (IFR) Room, and Tower Cab within the environmental range required.

Air diffusers should be located in a manner that will ensure uniform temperature and humidity throughout the ARTS IIE equipment areas. Ducts, diffusers, cable supports, conduits, system cabling, and power wiring should be located where they will not interfere with the exhaust air from the equipment. (Source: Hardware Detailed Design Document (HDDD), dated May 3, 1996)

5.2.2 HVAC Plans

Because the HVAC requirements for the ARTS IIIE A6.05/ARTS IIE A2.09 program will be fulfilled by current facility capabilities, there are no plans to augment HVAC.

SYSTEM COMPONENT		CHARACTERISTICS				COOLING
Type	Qty	Wt	Ht	Width	Depth	BTU/Hr
19" Rack Consisting of:	3	340	82.4	24	30	2659.8
MCP Processor		40	18.7	19	22	
SMC Processor		40	18.7	19	22	
Optical Disk Chassis			5.3	19	22.3	
WWVB Rec/Clock		7.25	1.8	19	10.5	
19" Rack Consisting of:	3	340	82.4	23	30	1023
MTP Processor		40	18.7	19	22	
19" Rack Consisting of:	2	280	76.7	24.6	32.7	2046
RDM	2	40				

SYSTEM COMPONENT		CHARACTERISTICS				COOLING
Type	Qty	Wt	Ht	Width	Depth	BTU/Hr
19" Rack Consisting of:	1	350	76.7	24.6	32.7	2387
ARTCC Converter Chassis	3	20.5	8.8	19	12	
GFE Digital Bridges	3	5	2.7	8.5	16	
A/B Switch	31					
19" Rack Consisting of:	1	241	76.7	24.6	32.7	2114.2
ARTCC Converter Chassis	6	20.5	8.8	19	12	
GFE Digital Bridges	9	5	2.7	8.5	16	
19" Rack Consisting of:	1	241	76.7	24.6	32.7	3928.3
DASI Converter/Bridges	4	20.5	8.8	19	12	
DASI Modem Rack	4	30	7	19	11	
19" Rack Consisting of:	1	241	76.7	24.6	32.7	2946.2
DASI Converter/Bridges	4	20.5	8.8	19	12	
DASI Modem Rack	4	30	7	19	11	
19" Rack Consisting of:	1	200	76.7	24.6	32.7	0
A/B Transition Switches						
Drivers in SCIP Rack	3	20.5	8.8	19	12	300.1
Full Digital ARTS Display	1	750	48	30	40	2550
SMC PC	6	200	50	30	30	800

Table 5-1 ARTS IIIE Equipment Characteristics

SYSTEM COMPONENT		CHARACTERISTICS				COOLING
Type	Qty	Wt	Ht	Width	Depth	BTU/Hr
Acquisition and Processing Cabinet	1	570	71.9	22.31	29.75	5600
Code Select Box	1	10	12	10	7.8	58
RADS (including casters)	1	708	50	30	54	2850
AACU	1	20	12	12	8	116
System Monitor Console PC	1	200	50	30	30	800

Table 5-2 ARTS IIE Equipment Characteristics

5.3 Cables

The FAA is responsible for providing and installing all cable trays, ladders, ducts, raceways, conduits, boxes, and internal and external trenches for Common ARTS equipment. These cable supports should be installed where they will permit the cables to be laid-in so the allowable bending radii of 10 inches will not be exceeded and where cables can enter the equipment in a

neat and correct manner. The term "laid-in" is to be interpreted to mean that cable pulling requirements will be minimized to the greatest extent practicable.

Cable trays are not required in the Tower Cab. However, the FAA should ensure a minimum opening of 6x6 inches is available to the Tower Cab. A cable tray (or equivalent) 6 inches wide by 3 inches deep is desired between the Tower Cab and the Equipment Room.

No part of the cable support system should be attached to the ARTS equipment.

Wherever cables are run vertically, provisions should be made to attach them to the cable support at approximately 16" intervals.

Dropouts in the cable support system at the FAA furnished junction boxes should be located to allow for the 10" bending radii. The location of the stuffing tubes in the junction box must be determined by the FAA.

Where cables are installed beneath elevated floors, the path of the cabling should be free from obstructions and sharp edges. The space beneath the floor should allow the cables to be installed with a minimum of pulling. (Source: Hardware Detailed Design Document (HDDD), dated May 3, 1996)

5.4 Power

5.4.1 Power Requirements

Power requirements are shown in Tables 5-3 and 5-4. (Source: Hardware Detailed Design Document (HDDD), dated May 3, 1996)

UNIT		INPUT POWER				LOAD ON POWER BUS
Type	Qty	Volts	Phs	Hz	Amps	Essential (KVA)
Acquisition and Processing Cabinet	1	120		60	15.8	1.9
Code Select Box	1	120		60	0.2	0.02
RADS (including casters)	1	120		60	10	1.2
AACU	1	120		60	0.3	0.04
Console Monitor Console PC	1	120		60	2.5	0.3

Table 5-3 ARTS IIE Power Requirements

5.4.2 Power Plans

Detailed power plans will be reviewed during the Site Survey. Regional AF personnel will coordinate with each site AF representative those actions necessary to provide the power circuits prior to start of installation activities.

CONFIGURATION ITEM		INPUT POWER				LOAD ON POWER BUS
Type	Qty	Volts	Phs	Hz	PF	Essential (Watts)
19" Rack Consisting of:	3	115	1	60	0.8	780
MCP Processor						300
SMC Processor						300
Optical Disk Chassis						130
WWVB Rec/Clock						50
19" Rack Consisting of:	3	115	1	60	0.8	300
MTP Processor						300
19" Rack Consisting of:	2	115	1	60		600
RDM	2					300
19" Rack Consisting of:	1	115	1	60		700
ARTCC Converter Chassis	3					88
GFE Digital Bridges	3					10
A/B Switch	31					TBD
19" Rack Consisting of:	1	115	1	60		620
ARTCC Converter Chassis	6					88
GFE Digital Bridges	9					10
19" Rack Consisting of:	1	115	1	60		1152
DASI Converter/Bridges	4					88
DASI Modem Rack	4					200
19" Rack Consisting of:	1	115	1	60		864
DASI Converter/Bridges	4					88
DASI Modem Rack	4					200
19" Rack Consisting of: A/B Transition Switches	1	0	0	0		0
Drivers in SCIP Rack	3					88
Full Digital ARTS Display	1	115	1	60		1700
SMC PC	6	120	1	60		300

Table 5-4 ARTS IIIE Power Requirements

The site is responsible for facility physical security and personnel safety in accordance with FAA policy and standards.

5.5 Security, Safety, and Health

5.5.1 Security and Safety Requirements

The ARTS IIIE A6.05/ARTS IIE A2.09 will comply with the personnel safety requirements listed in FAA specification FAA-G-2100e paragraph 3.3.6 or with an equivalent industry standard, approved by the Government.

5.5.2 Physical Security & Personnel Safety Plans and Procedures

Security and safety plans and procedures pertaining to the handling of ARTS IIIE A6.05/ARTS IIE A2.09 equipment and facility preparations, are required to comply with FAA-STD-20a, paragraph 3.11.

5.6 Environmental / Hazardous Materials (HAZMAT)

5.6.1 Environmental Requirements

The equipment is replacing existing equipment in existing facilities, and there are no known environmental concerns. The Common ARTS environmental requirements are shown in Table 5-5. (Source: Hardware Detailed Design Document, dated May 3, 1996)

Normal Condition	COTS Equipment	Other Equipment
Temperature (Air Intake)	50 - 90 degrees F	40 - 122 degrees F
Relative Humidity	20 - 80%	10 - 80%

Table 5-5 Environmental Conditions

5.6.2 HAZMAT

Manufacturers are required to identify hazardous materials, display hazard warning labels on each piece of equipment, and provide disposal procedures for any hazardous materials. Once material is identified as hazardous waste, special storage time limits are required (90 days in most cases). There are no known hazardous materials in the Common ARTS equipment.

5.7 Grounding, Bonding, Shielding & Lightning Protection

5.7.1 Grounding, Bonding, Shielding & Lightning Protection Requirements

Grounding, bonding, shielding, and lightning protection requirements will be identified in the ARTS IIIE INCO Plan, Contract Data Requirements List (CDRL) L002B and the ARTS IIE Installation Planning Report, CDRL L007A.

5.7.2 Grounding, Bonding, Shielding & Lightning Protection Plans

All ARTS IIIE A6.05/ARTS IIE A2.09 equipment installations are required to meet all grounding, bonding, shielding, and lightning standards, in accordance with FAA-STD 020a paragraph 3.8.

5.8 Space

5.8.1 Space Requirements

The FAA is responsible for the preparation of preliminary equipment layout plans and cable routing diagrams based on the information provided in the ARTS IIE Installation Planning Reports and the ARTS IIIE Installation Plans provided by the contractor. These reports and plans will provide the floor layout and clearances necessary for equipment operation and maintenance. The site is responsible to ensure that sufficient space is available for contractor use and appropriate access is available to permit movement of the new equipment/shipping containers into and within the facility during the installation. (Source: Hardware Detailed Design Document (HDDD) dated May 3, 1996)

5.8.1.1 ARTS IIIE System

The new equipment requires significantly less floor space than the equipment being replaced. However, added floor space will be required during the period of installation and checkout until cutover and de-installation of ARTS IIIE A6.04 or ARTS IIIA hardware is no longer required. Proposed floor layouts and power and physical characteristics, including front and rear access requirements, will be provided in the ARTS IIIE INCO Plans for each site.

5.8.1.2 ARTS IIE System

Equipment located in TRACONs/TRACABs requires the approximate floor space indicated in Table 5-6. Minimum and maximum square footage identified in the following table is based on the three possible ARTS IIE configurations.

Facility Type TRACON/ TRACAB	Operations Room / Tower Cab (SqFt)	Equipment Room (SqFt)	Administration Area (SqFt)
SS/SP	135sf min. to 1485sf max	130.31sf	N/A
SS/DP	135sf min to 2970sf max	260sf	N/A
DS/DP	135sf min to 2970sf max	260sf	N/A

Table 5-6 ARTS IIE A2.09 Equipment Suite Space Requirements

5.8.1.3 ARTS IIE Kit

During the period of ARTS IIE upgrade kit installations, the FAA will be responsible for providing sufficient space in the vicinity of the APC cabinet to allow the placement of a temporary 19 inch rack unit to be used for holding the Magnetic Tape Unit (MTU) and the LSI 2/40 chassis. The temporary rack will be located to the right of and in front of the APC cabinet. The orientation of the rack will be at 90 degrees to the APC cabinet. Lockheed Martin must be notified within 30 days prior to the start of installation if the temporary rack cannot be located in this position. Sufficient space must be present for the installer to open the APC cabinet from the rear as well as space to remove components from the front of the cabinet. Lockheed Martin will also require approximately 120 square feet for a securable staging area during kit installation.

For the RADS VTC upgrade kit installation, the FAA will be responsible for providing adequate space for the installer to open the front of the RADS cabinet and remove the card rack and the power supply. Sufficient space is also required at the rear of the cabinet if the RADS Relay Kit is to be installed. The FAA must notify Lockheed Martin within 30 days prior to the installation date if this space is not within an easily accessible distance from the location of the RADS consoles.

5.8.2 Space Allocation Plans

The Common ARTS equipment will be accommodated within existing space. No further space planning is needed.

5.9 Construction & Modification

Site surveys will be conducted at each site prior to deployment of equipment. The site survey will contain the equipment layout, power requirements, cable lengths, cable routing, and facility modifications necessary to accommodate the ARTS IIIE A6.05/ARTS IIE A2.09 equipment that will be installed at each facility. AF personnel at each site will establish a configuration baseline which satisfies floor space and power requirements.

Since the ARTS IIE system upgrade kit replaces existing subassemblies in existing APC cabinets in the equipment room, no architectural or structural preparations will be required, and a physical site survey by Lockheed Martin will not be conducted.

5.10 Telecommunications

5.10.1 Telecommunications Requirements

Sites are responsible to ensure availability of the necessary telecommunication links required for operation of the ARTS.

On a transitory basis, it is recommended that sites make telephone communications systems available for use during the installation and checkout of the Common ARTS equipment. Communications are desired between the equipment room and the IFR room, equipment room and Tower Cab, and Tower Cab and IFR room. These telephone communications should be near the normal operating or maintenance positions of the equipment to facilitate use by installation team members.

5.10.2 Telecommunications Plans and Procedures

Telecommunication requirements for the ARTS IIIE A6.05/ARTS IIE A2.09 program will be in place prior to deployment of systems. Therefore, there are no Plans and Procedures required unless new requirements are identified.

5.11 Water and Sewer

Water and sewer requirements and plans are not applicable..

5.12 Roadways and Access

Existing roadways and access to current ARTS sites are anticipated to fulfill these requirements.

6.0 IMPLEMENTATION REQUIREMENTS

6.1 Implementation Management

The Terminal Automation Implementation Group (TAIG) is the primary group responsible for supporting the Terminal Automation IPT on implementation activities. The TAIG is comprised of ANS-700, AUA-330, DoD, ARU-200 (AT and AF), and NATCA/PASS representatives. Implementation issues are identified, tracked and resolved as stated in paragraph 1.4.

6.1.1 Associate Product Lead for NAS Implementation (APLNI)/Implementation Support Specialist (ISS)

The APLNI, Don Roberts, 202-267-3917, and ISS, Gus Waters, 202-646-2196 have been assigned to the ARTS IIIE A6.05/ARTS IIE A2.09 program by ANS-700. The APLNI and ISS are responsible for reviewing contractor-developed implementation plans, procedures and reports. They are also responsible for coordinating information gathering for development of the PIP. The APLNI and ISS, in coordination with the Associate Product Lead for Terminal Automation Transition and Implementation (APLTATI), will assist the Product Lead in compiling implementation information and data required to develop and refine implementation budget estimates. They will also assist in the development of major acquisition milestones relating to implementation and transition. They will represent and address field implementation issues and concerns to the TAIG and product team.

6.1.2 Associate Product Lead for Terminal Automation Transition and Implementation (APLTATI)

The APLTATI, Mark Katzen, 202-233-4858, and Teri Bristol, 202-233-3138, have been assigned to the Existing Products Terminal Automation Team by AUA-300. They will coordinate terminal automation deployment activities within the IPT and resolve programmatic schedule issues. The APLTATI, in coordination with the APLNI/ISS, will also act as a liaison between the product team and the regional/site personnel. They will identify and resolve programmatic implementation issues with the TAIG and product team.

6.1.3 Field Level Involvement

The Field Implementation Team (FIT) participates in PIP coordination and supports resolution of program implementation and transition issues. The FIT is chaired by ANS-700 and is comprised of headquarters elements and personnel listed in Table 6.1.1 and regional ANI-500 representatives. Other participants from headquarters, Regions, and the field are routinely called upon to participate in FIT meetings depending on the phase of implementation and whether agenda items are of interest to them.

6.1.4 Regional Associate Program Manager (RAPM)

Regional Associate Program Managers (RAPM) will function as the single point of contact for program matters within the Region. They will coordinate regional reviews and responses to FAA Headquarters and program documents as necessary. Table 6-2 provides a listing of current RAPMs.

NAME	OFFICE	POSITION	TELEPHONE
John R. Hamilton	AUA-320	Product Lead	202-233-5021
Elaine Hubbard	AUA-320	ARTS IIIE Product Manager	202-233-3139
Mark Katzen	AUA-330	ARTS IIE Product Manager	202-233-4858
Teri Bristol	AUA-330	ARTS IIE Product Manager	202-233-3138
Joe Carey	ASU-350D	Contracting Officer	202-233-3415
Molly Vorce	AUA-300	Business Manager	202-233-3007
Donnie Barnhill	ATR-320	AT Requirements	202-366-8702
Marcus Brown	ATO-120	AT Procedures	202-267-9440
Arthur Hutchinson	AFR-201	APML	202-493-0687
Norman Hitchner	ACT-211	Testing	609-485-5201
Anita Battersby	AOS-430	ARTS IIE Software	609-485-6392
George Preslock	AOS-430	ARTS IIIE Software	609-485-6380
Cortez Martin	AOS-460	OSF Manager	609-485-6351
Ruben Conde	AOS-420	ARTS IIIE Hardware Support	609-485-6392
Mike Meier	AOS-420	ARTS IIE Hardware Support	609-485-5257
Garry Long	AFZ-100	AF Training	202-366-7046
Don A. Roberts	ANS-700	Implementation	202-267-3917
Gus Waters	ANS-700/ NISC	Implementation	202-646-2196

Table 6-1 Support Team Personnel

REGION	NAME/OFFICE	TELEPHONE
Southwest	Barry Hartz/ANI-610	817-222-4296
Great Lakes	Rick Murphy/ANI-459	847-294-7590
Northwest Mountain	Mark Stack/ANI-840	206-227-2935
Eastern	Ed Salvesen/ANI-220	718-553-3468
Western Pacific	Ed Felipe/ANI-922	310-725-3498
New England	Bruce Ng/ANI-120	617-238-7434
Central	Scott Lueckert/ANI-520	816-426-2242
Alaskan	Mel Leskinen/ANI-740	907-271-4062
Southern	Paul Smith/ANI-308	404-305-6289

Table 6-2 RAPMs

6.1.5 Technical On-site Representatives (TOR)

The TOR will provide site ARTS administrative support functions for the ARTS IIIE A6.05/ARTS IIE A2.09 contract and implementation efforts. The TOR will be the principle on-site representative and will report problems, progress, and other matters to the Regional Airway Facilities Division. Site activities will be coordinated through the TOR. TOR's for ARTS IIIE A6.05/ARTS IIE A2.09 are identified by the regions.

6.2 Funding Resources

The Program Office, AUA 300, has provided site preparation funding to each region, for ARTS IIIE and ARTS IIE. These funds were allocated as needed for construction /modification, storage, power systems upgrades to accommodate needed improvements.

6.3 GFP/GFI/GFE Obligations

There are no requirements for Government Furnished Property (GFP) or Government Furnished Items (GFI) for ARTS IIIE or ARTS IIE.

The only GFE obligations for ARTS IIE will be the use of a 100 MHZ oscilloscope during the installation of the site. Site adaptation must also be completed prior to installation. There is no additional GFE required for ARTS IIIE.

6.4 Inter-Agency Involvement

6.4.1 Department of Defense (DOD)

Terminal air traffic control services will encompass some DOD facilities. These services will consist of providing aircraft control until hand-off to the local DOD controllers, tower, or local radar approach control. The method and location of hand-off points and procedures are established between the FAA TRACON and the DOD facility by use of a local Letter of Agreement or Memorandum of Agreement.

6.4.2 Other Agencies

Not applicable.

6.5 Site Implementation Process

6.5.1 Implementation Planning Phase

Spanning the time prior to equipment installation and extending into the integration and testing of new systems, there are ongoing FAA program implementation planning responsibilities. These include, but are not limited to, the following:

- Review and comment on the initial PIP and each of its updates
- Participation in Field Implementation Teams (FIT) and resolution of local and regional implementation discrepancies and issues
- Review and comment on program CDRL items
- Attendance/participation in program reviews, design reviews and other activities which may require the insight and experience of personnel from the field
- Provision of escort support, especially during installation and testing activities
- Appointment by Regional office of site TOR, AT and AF representatives to support installation and testing at each facility
- Designation of key AF site personnel responsible for preparation of site adaptation data
- Coordination of terrain map generation for each site

6.5.2 Site Preparation Phase

The Site Preparation phase begins with the conduct of the program site survey and concludes with delivery of program equipment at the site. During the interval between these two milestones, all site preparation tasks necessary for installation of hardware including site surveys, site preparation, and hardware delivery are performed. F&E activities include building preparations, storage, providing facility power, space, air-conditioning, communications access, and Government support equipment preparations. The escort support activity will be conducted within each site's specific regulatory practices. Site regulatory procedures pertaining to escort activity will be agreed upon during the site survey and reviewed during the pre-installation kickoff meeting between the contractor and associated FAA personnel. Preparation of the site adaptation parameters will also commence at this time.

6.5.2.1 ARTS IIIE System

Lockheed Martin will perform a site survey in cooperation with the FAA TOR at least 90 days prior to the scheduled installation. The timing of the site survey will allow sufficient lead time for the contractor to prepare the required system cables and for the FAA to prepare the site for the installation. During the site survey, Lockheed Martin will gather detailed site data identifying equipment placement, power, grounding, environmental, LAN installation, and other considerations. Lockheed Martin will also identify all site preparation work to be completed by the FAA prior to ARTS IIIE equipment delivery.

The FAA TOR will assist the Lockheed Martin representative in the site survey by:

- Reviewing the site survey checklist and assisting the Lockheed Martin field representative in obtaining needed data
- Assisting in the review and preparation of the Site Installation Plan (SIP), contract data requirements list (CDRL) item L002
- Arranging access to the installation areas with the operations personnel
- Providing site data including:
    - Floor plans showing the cabinet and auxiliary equipment placement locations in each room (i.e., Equipment and IFR);
    - Electrical and mechanical drawings depicting: Primary power distribution; power and signal cable routing via conduit or cable trays, ducts, and supports; pull/junction boxes;
    - wall and panel cutouts, where required, for the AACU's and Alarm Speaker Boxes (one associated with each display and one for the tower);
    - FAA signal distribution panels (if used); and any other information or advice required to accomplish the installation;
    - A table listing existing primary power and air conditioning by room location

Following completion of the site survey, Lockheed Martin will prepare the SIP, fully definitizing the activities to be performed by both Lockheed Martin and the FAA from equipment delivery through completion of hardware acceptance testing.

Shortly before INCO, Lockheed Martin will conduct a site readiness review to ensure the facility interface requirements to the ARTS IIIE equipment have been satisfied. Any changes or variances in interface requirements will be assigned and resolved at this time.

Lockheed Martin will arrange delivery of all ARTS equipment and material, without damage or loss, to the installation site. The contractor's responsibility will continue through the off-loading phase and placement of the equipment at the designated installation position. FAA personnel need not assist Lockheed Martin in this activity except to clear aisles and areas to allow for intra-facility transport of the delivered items to their destined locations within a respective site or building as specified by the site coordinator. In addition, Lockheed Martin will notify the site coordinator of shipment fifteen (15) calendar days prior to shipment. Notification is to include planned date of shipment; contract number; description of the equipment or material and quantities; and, name(s) of carriers.

During the site preparation phase, the designated AF personnel will proceed with development of the site-specific adaptation data required to customize the software to the site.

6.5.2.2 ARTS IIE System

Site Preparation activities for ARTS IIE systems are as identified for the ARTS IIIE in paragraph 6.5.2.ft.

6.5.2.3 ARTS IIE Upgrade Kit

For each ARTS IIE site receiving an upgrade kit, site preparation activities are as identified in paragraph 6.5.2.1 with the exception that Lockheed Martin will deliver a Site Survey Report instead of a SIP and will conduct a telephone site survey instead of a physical site survey. Relevant Lockheed Martin responsibilities include:

- Developing and delivering a site survey data form to the site to be completed by the FAA and returned to Lockheed Martin prior to the telephone site survey. The data form will request information on the status of all existing equipment which will be involved in the kit installation
- Scheduling and conducting a telephone site survey at least 90 days prior to scheduled installation to allow detailed planning of the ARTS IIE system upgrade kit installation
- Delivery of the equipment. The FAA site coordinator will be notified 15 calendar days before the date of shipment. Shipment of any equipment will not be made unless the required quantities of computer programs, diagnostics and maintenance software are shipped concurrently

FAA responsibilities include:

- Scheduling one individual to assist the Lockheed Martin field engineer with the removal of the APC power supply and magnetic tape unit
- Scheduling a period of 8 hours of ARTS IIA system downtime on each day of the installation
- Participating in a telephone site survey meeting. Prior to this time, the FAA will receive, fill out and return a data form to Lockheed Martin which will contain all of the pertinent site survey information
- Proceeding with the site adaptation parameter process and have the completed files readied for incorporation into the operational program
- Accomplishing the following site preparation tasks:

- FAA power distribution panels to all ARTS IIE equipment positions in the FAA Equipment, Tower Cab and IFR rooms;
- Cable Support Facilities - provide all cable trays, ladders, ducts, raceways, conduits and associated hardware support for primary power and all control and data signal cables within the ARTS IIE equipment room and to the ARTS IIE display console positions. All electrical cable support facilities required to support cables running between ARTS IIE cabinets and FAA interconnection cabinets (if any) in the FAA equipment room must be provided by the FAA. The cable support facilities must be brought to the approximate area of the new equipment;
- Air Conditioning - investigate the facility air conditioning capability and increase capacity (if needed) to maintain the temperature and humidity of the Equipment Room and IFR Room within the environmental range required;
- Area Lighting - provide sufficient lighting to accomplish the installation;
- Communications Facilities - provide sufficient telephone communications to accomplish the installation and testing;
- Provide all necessary external signals at a location in close proximity to the ARTS IIE equipment for installation;
- Install contractor-furnished 4/0 cables and ground plates (supplied 30 days prior to installation);
- Provide and install demarcation junction boxes as required;
- Install and check-out all primary power circuits between the power distribution panel and the ARTS IIE equipment locations;
- Provide openings (panel cutouts, as necessary) and mounting provisions for all operator/controller indicator subassemblies and templates;
- Prepare the SMC for installation into the ARTS IIE system.

6.5.2.2.2 RADS VTC Upgrade Kit

The major Lockheed Martin responsibilities are:

- Developing and delivering the site survey data form to the site for completion before conducting the telephone site survey. The form will request information and status regarding RADS for this installation. This form is to be completed and returned to Lockheed Martin prior to the telephone site survey
- Initiating the telephone site survey to allow detailed planning of the RADS VTC upgrade kit installation
- Preparing for the upgrade by installing and testing the RADS VTC upgrade kit in RADS at Lockheed Martin 's VFEC facility. After kit proofing, the shipment of VTC Upgrade kits for installation at the ARTS IIA sites will begin.
- Delivering all RADS VTC Upgrade kit equipment and material to the designated installation site and providing advanced notification of shipment as follows:
  - Lockheed Martin will be fully responsible for shipment and any damage or loss of the VTC upgrade kit (including shipping arrangements and full value liability). This responsibility will continue through the off-loading and placement of the equipment at the designated installation position.

- Notify the FAA site coordinator 15 calendar days prior to the date of shipment.
- Notification will include: planned date of shipment; contract number; description of equipment and quantities; and, name of carrier. Shipment of any equipment will not be made unless the required quantities of computer programs, diagnostics and maintenance software are shipped concurrently

The FAA will prepare for the RADS VTC upgrade installation by planning for and performing the following activities:

- Scheduling one person to assist the Lockheed Martin field engineer to help with the removal of the RADS power supply if the new power supply has not been previously installed
- Completing and returning to Lockheed Martin the site survey data form prior to the telephone site survey.
- Identifying the physical area in which the RADS will be upgraded
- Participating in the telephone site survey meeting
- Preparing for equipment delivery by performing the tasks defined in this document and notifying Lockheed Martin of any anticipated deviations. The FAA will accept delivery of the kit hardware prior to the arrival of the Lockheed Martin field engineer and store the kit hardware until the scheduled installation date
- Installing the RADS Relay Kit, as applicable

6.5.3 INCO Phase

The INCO phase begins with receipt of the program equipment at the site and continues through successful completion of testing of the equipment. The INCO phase entails the following sub-phases:

- System Test Dry Run at the WJHTC by the contractor
- Formal System Test at the WJHTC by the contractor
- Integration and Shakedown Tests at the WJHTC by FAA
- Site Hardware INCO at sites by contractor
- Site-specific Software Build and Delivery to sites by AOS
- System Onsite Test at sites by contractor
- Contractor Acceptance Inspection (CAI) at sites by FAA and contractor

6.5.3.1 System Test Dry Run at the WJHTC

After delivery of software and installation and checkout of the new ARTS hardware at the WJHTC, the contractor will perform System Test Dry Run at the WJHTC. Responsibilities of Lockheed Martin include:

- Requesting use of WJHTC laboratory facilities
- Execution of the test procedures documented in CDRL item T002, System Test Procedures
- Recording of the test activities, including discrepancies encountered
- Conduct of Test Readiness Review (TRR), presenting the results of dry run testing
- Update of software and system test procedures as needed

FAA responsibilities include:

- Appointment of system test directors (ACT-200)
- Definition of entry criteria for TRR
- Monitoring of dry run testing by ACT-200, AOS-400, AT, AF, Quality Reliability Officer (QRO), and field site representatives
- Evaluation of success of dry run testing at TRR and approval of TRR to enable the contractor to begin Formal System Test
- Approval of CDRL item T002, System Test Procedures

6.5.3.2 Formal System Test at the WJHTC

Upon approval of the TRR, the contractor will perform Formal System Test at the WJHTC. This step culminates in FAA approval of System Test following successful Acceptance Test Review (ATR). ACT-200 will serve as FAA test director, with AOS-430, AOS-420, ACT-200, AT and AF representatives as monitors. FAA-approved System Test procedures to be executed will be definitized in CDRL item T002, System Test Procedures. The following system tests are planned:

- Equipment Failures
- Continuous Data Recording
- SMC Entries
- Enhanced Target Generator (ETG)
- Keyboard Entries
- Remote Tower Display Subsystem (RTDS)
- Capacity/ Response/Throughput
- Tracking
- Conflict Alert/Mode C Intruder/Minimum Safe Altitude Warning
- Network Demonstration
- Modes of Operation
- Confidence/Stability and Recovery With/Without Critical Data
- Casefiles
- Interfacility
- Display Output
- Maintenance Support
- Inspection

Responsibilities of Lockheed Martin include:

- Coordination of laboratory facilities with ACT-211
- Provision of detailed test schedules to the FAA
- Maintenance of electronic configuration management of software, testing, and discrepancy systems
- For each test session, provision of adequate test personnel, quality assurance support, and configuration management support
- For each test session, the contractor will provide appropriate test procedures to the FAA monitors
- Execution of the approved test procedures documented in CDRL item T002, System Test Procedures

- Recording of the test activities, including discrepancies encountered
- Update of software and system test procedures as needed
- Participation in ATR providing a formal review of the results of system test

FAA responsibilities include:

- Appointment of System Test directors for each test session
- Definition of entry and exit criteria for System Test
- Monitoring of test sessions, including pre- and post-meetings, by ACT-200, AOS-400, AT, AF, QRO, Program Office, and field representatives. Other monitors will be present as the System Test director deems necessary
- Approval of each test session report by test director
- Participation in and evaluation of the ATR
- Approval of the ATR

6.5.3.3 Integration and Shakedown Tests at the WJHTC

System Integration, conducted by ACT-200, and System Shakedown, conducted by AOS-400, is executed in coordination with ATR and AFS to ensure that all requirements testable at the WJHTC have been correctly implemented in the system baseline. Regional and site AT and AF representation as well as the QRO, AUA, and other appropriate FAA organizations monitor this activity. The contractor provides support throughout Integration and Shakedown testing.

6.5.3.4 Site Hardware INCO

Site Hardware INCO includes the activities involved with installation and verification of operability of all new and modified hardware. Equipment placement, cable routes, and facility modifications, and test verification will be specified in general system INCO plans, in the individual site installation plans/reports, and during subsequent discussions with FAA site personnel. FAA will work closely with Lockheed Martin to verify interfaces, power distribution, grounding, and unit level performance requirements. F&E personnel will ensure all cables are properly labeled and bundled without introducing stress on connectors. Lockheed Martin will install all new ARTS intra-system cables, all cables to transition switches, the transition switches, and the IEEE 802.3 network. Following delivery, the new hardware will be inspected, then located in the facility according to the floor plan. Installation and standalone tests/diagnostics will be run. After completion of this, various unit/subsystem tests will be performed to verify system operability for each unique piece of ARTS hardware. Further verification will be performed during SOST and System Integration and Shakedown.

The major Lockheed Martin responsibilities are:

- Equipment Installation-Lockheed Martin will perform the complete system equipment installation at the ARTS site and will:
  - Assume responsibility for all mechanical/physical installation aspects for the entire system, including all intra-equipment cables between subsystems;
  - Perform the electrical installation and checkout of all ARTS cabling, wiring, connectors and associated hardware, and for making all cable and wire terminations for the equipment room as well as ATC operations area equipment. This includes installing and checking out the grounding system,

all ARTS inter-equipment cables and ARTS-to-external equipment cables, connectors and terminations, and electrical cabling and connections for any special test equipment required
- Provide adequate staffing of on-site contractor personnel
- Furnish the following items at least 30 calendar days before equipment delivery: connectors to connect the ARTS equipment to the power cables and ground plates with 4/0 (or in some cases 1/0) ground cables

- Equipment Acceptance Test - Lockheed Martin will perform the required Equipment Acceptance Test in accordance with ARTS IIIE and ARTS IIE specifications, FAA-E-2759 and FAA-E-2570D, respectively, and the FAA-approved test plan and test procedures. The tests will be performed in coordination with the FAA TOR, and upon test completion Lockheed Martin will sign the test documents

The primary FAA responsibilities include:
- Installation and checkout of all power circuits between the power distribution panel and the ARTS equipment locations
- Ensuring that the interfacing equipment is operating in a normal manner and that it provides the correct signals for interface verification by Lockheed Martin
- Witnessing and signing the acceptance test documents

6.5.3.4.1 ARTS IIIE Hardware INCO

Basic INCO tasks are outlined in paragraph 6.5.3.5. Specific INCO activities for each ARTS IIIE operational site and for the WJHTC are fully defined in the respective CDRL item L002B, SIP. Included in each site's plan are the following items:
- Hardware list, configuration, physical characteristics, and equipment placement
- Installation approach
- Receiving and inspection requirements
- Government furnished equipment (GFE)
- Contractor INCO team specifics
- Site requirements
- Installation procedures for each ARTS equipment item. Stand-alone tests and diagnostics as well as hardware integration testing are identified in the SIP

For each facility, the associated SIP should be referenced to obtain complete hardware INCO activities.

At all sites, the ARTS IIIE equipment to be installed by Lockheed Martin will be placed in six 19-inch racks. Three racks will house the triple redundant CP's, SMC's, TP's, along with related switches and converters. Another rack will contain RDM's. The remaining racks will contain converters and digital bridges. An extension of the current IEEE 802.3 LAN will connect the A6.05 hardware to that of the existing ARTS IIIE A6.04 or ARTS IIIA system.

6.5.3.4.2 ARTS IIE Hardware INCO

Fundamental hardware INCO activities common to all ARTS sites are described in paragraph 6.5.3.5. A detailed description specifically for the ARTS IIE system is contained in CDRL item

L007A, Installation Planning Report for ARTS IIE Systems (including Video Time Compression); the Site Survey Report provides specific details for each site. These documents are the primary reference resources for ARTS IIE hardware INCO. The information presented below provide a general overview of hardware INCO activities required for new ARTS IIE sites (paragraph 6.5.3.4.2.1) and for existing ARTS IIA sites being upgraded to the ARTS IIE configuration (paragraph 6.5.3.4.2.2).

6.5.3.4.2.1 ARTS IIE Hardware INCO for New ARTS II Sites

This section applies to sites not previously having an ARTS II system.

The ARTS IIE system includes the APC, which contains the SP Subsystem, Interface Processing Subsystem, DDAS, KDC and DDCP interfaces to DEDS. One APC cabinet is required in the single sensor, single processor configuration, whereas two APC cabinets are required in the single sensor, dual processor configuration and in the dual sensor, dual processor configuration. The system also includes the RADS, the SMC (1 per APC cabinet), the AACU's (1 per APC cabinet), the Aural Alarm Speaker Units (AASU), Display Control Panel (DCP) (1 per RADS or DBRITE display), a Code Select Box (CSB) (1 per APC cabinet), and a beacon Remote Control Box (RCB) (1 per APC cabinet). The ARTS IIE is capable of interfacing with the DBRITE Display Subsystem for providing the Tower Cab display.

The APC cabinet and the SMC will be placed in their final locations. RADS consoles and small boxes (i.e., display control panel, code select box, etc.) will be placed in the equipment room for initial checkout and testing. Roller lifts will be used to move the equipment where practical.

The contractor's time on site will be nine days, which begins with unloading the ARTS IIE equipment from the truck, proceeds through installation, checkout and test, and concludes with sign off of the acceptance papers.

6.5.3.4.2.2 ARTS IIE Hardware INCO for Existing ARTS II Sites

This section applies to sites with an existing ARTS IIA that will be upgraded to the ARTS IIE configuration. The upgrade involves INCO of RADS VTC Upgrade Kit and the ARTS II Upgrade Kit. The recommended sequence of installation of the two upgrade kits is the installation of the RADS VTC Upgrade kit to precede the installation of the ARTS IIE System Upgrade Kit. INCO of the two upgrade kits is described in paragraphs 6.5.3.4.2.2..

6.5.3.4.2.2.1 Installation and Checkout of RADS VTC Upgrade Kit

VTC introduces a hardware change that is incorporated into the RADS display consoles and the DDCP boards of the APC. The initial installation, listed below, incorporates the changes to the RADS consoles. The DDCP changes will be incorporated when the ARTS IIE System Upgrade Kit is installed.

Elements of the VTC upgrade are:

- Replacement of the present ITT power supply in the RADS cabinet with a new power supply
- Replacement of the solid state relays in the RADS for all RADS which have not been updated with the new higher-capacity AC mechanical relay

- Replacement of the existing RADS card cage and backplane
- Installation of the new VTC circuit board in the RADS backplane
- Replacement of the present Video Amplifier RADS (VAR) board with a modified VAR board
- Change switch settings on the Plan Position Indicator (PPI) and High Order Language (HOL) boards
- Modification of the Deflection Amplifier Heat Sink HSK board
- No new cable trays, ducts or conduit are required for this installation

The RADS units to be modified will first undergo a preliminary test to assure that the units meet all functional requirements and do not require adjustment or repair prior to installation of the RADS VTC modification.

The maintenance RADS will be the first unit to be modified. After this unit has been completed and checked out, the maintenance RADS will be placed in the position of one of the IFR RADS units. The replaced RADS unit from the IFR room will then be brought into the area previously occupied by the maintenance RADS and will be modified. After completion and testing, this RADS unit will be placed into service in the IFR room and the next RADS unit will be brought into the maintenance area for modification. This will continue until all RADS units have been modified.

The major Lockheed Martin INCO responsibilities are:

- Perform the complete kit installation, including power supply upgrade, relay kit installation and VTC kit installation, at the FAA site and will accept the following responsibilities:
  - Responsibility for all mechanical/physical aspects of the kit installation
  - Responsibility for the electrical installation and checkout of all upgrade kit cabling, wiring, connectors and associated hardware
- After installation of the ARTS VTC Upgrade kit, conduct an on-site acceptance test in accordance with FAA-approved test plan and test procedures in cooperation with the FAA TOR. Measurements to show that the RADS is operating in video time compression mode will be made as part of these tests. Lockheed Martin will record all test results during the acceptance test and will sign the test documents.
- After installation of the ARTS IIE System Upgrade Kit, conduct further on-site acceptance testing in accordance with FAA-approved test plans and procedures. Tests to assure that each modified RADS console meets all functional specifications and measurements to verify that the RADS is operating in video time compression mode will be included in the acceptance verification

The major FAA INCO responsibilities include:

- Providing one person to assist the Lockheed Martin field engineer to help with the removal of the RADS power supply if the new power supply has not been previously installed
- Ensuring adequate space for RADS upgrade activities
- Ensure the availability of RADS Relay Kits for installation, as applicable

- Accepting delivery of the kit hardware prior to the arrival of the Lockheed Martin field engineer and store the kit hardware until the scheduled installation date
- Ensuring that the ARTS IIA RADS consoles are operating in a normal manner prior to installation of the upgrade kit
- Providing an FAA TOR to witness the post-testing operation and sign the acceptance test documents with the contractor

Elements of the ARTS IIE System Upgrade INCO include:

- Removal of MTU
- Installation of new APC power supply
- Repositioning of LSI/240 power supply
- Removal of original UPS supply
- Removal of Azimuth Data Converter (ADC) transformer chassis and cards
- Installation of new UPS unit
- Installation of Versa Module Eurocard (VME) chassis into temporary rack
- Installation of external connector panel assembly into temporary rack
- Installation of maintenance panel/network switch assembly into APC cabinet
- Installation of DNIP/DA and DCI boards
- Installation of SMC PC
- Load software and diagnostics
- Dry run SOST
- Removal of Mode S/ASR-9 Line Adapter (MALA) boards
- Installation of DDCP boards for Video Time Compression
- Installation of VME chassis in APC cabinet
- Installation of SMC
- Run SOST (defined in paragraph 6.5.3.6.1)
- Run 72 hour confidence test (defined in paragraph 6.5.3.6.2)

The major Lockheed Martin INCO responsibilities are:

- Remove the ARTS IIA equipment to be replaced and install the ARTS IIE equipment, including all intra-equipment cables between subsystems. No new cable trays, ducts or conduit are required for installation;
- Furnish all cables, wiring, connectors and associated hardware and make all cable and wire terminations. No new power or ground circuits need to be supplied by the FAA for this installation;
- After installation, conduct SOST as documented in paragraph 6.5.3.6.1.

The major FAA INCO responsibilities are:

- Provide one person to assist Lockheed Martin with the removal of the APC power supply and the Magnetic Tape Unit
- Ensure adequate space for kit upgrade activities
- Accept delivery of the kit hardware prior to the arrival of the Lockheed Martin installation team
- Schedule a 48 hour period for installation; six consecutive eight hour midnight shifts

6.5.3.5 Site-Specific Software Build and Delivery to Sites by AOS

Following successful accomplishment of Integration and Shakedown testing, AOS-430 will build and deliver the software baseline for ARTS IIIE and for ARTS IIE sites. AOS-420 provides required firmware. The appropriate baseline is then delivered to the site.

6.5.3.6 System On-site Testing

Prior to field distribution, the ARTS system baseline will undergo Test SOST at an ARTS IIIE and an ARTS IIE site. Other tasks occurring before general field distribution include FCA/PCA, Functional Verification, ISR activities, and Keysite testing. Once completed, the baseline will be delivered to each designated ARTS II and ARTS III site for Deployment SOST. Test SOST and Deployment SOST activities are explained in the following paragraphs.

6.5.3.6.1 Test SOST

The Test SOST is a pre-PCA/FCA validation test that is conducted at FAA-chosen sites. Test SOST will be performed by the contractor, with witnessing by an FAA team including AOS, ACT, AUA, QRO, ATR, and regional and site AT and AF representatives. This test consists of 80 hours of formal testing that uses FAA-approved test procedures derived from the System Test, and demonstrates the system functionality including the site's case files. The test procedures are site-specific containing references to unique site adaptation features. The Test SOST will be conducted at one ARTS IIIE site and one ARTS IIE site, currently identified as SCT and Ft. Smith, respectively. At the conclusion of Test SOST, the following activities will occur:

- Site ATR
- Contractor fixes to identified discrepancies
- FCA/PCA
- Functional Verification at WJHTC
- ISR tasks, concluding in Deployment Decision to accept the A6.05/A2.09 system baseline
- Keysite Shakedown testing at ARTS IIIE and ARTS IIE sites, currently identified as SCT for ARTS IIIE, Ft. Smith and Pensacola for ARTS IIE

Successful completion of the above tasks culminates in approval to distribute the baseline for operational use at ARTS II and ARTS IIIE sites.

6.5.3.6.2 Deployment SOST

Deployment SOST is conducted by the contractor at each ARTS IIE and ARTS IIIE site after FCA/PCA and consists of 8 hours of system testing and 72 hours of random entry C & S testing. A Deployment SOST will be conducted at each ARTS operational site. Elements include:

- Installation of the ARTS software baseline, including site adaptation data and terrain maps
- Performance of site testing in accordance with the Site Acceptance Test Plan, CDRL item T003
- Preparation and delivery of the System Onsite Acceptance Test Report, CDRL item T006

6.5.3.7 Contractor Acceptance Inspection (CAI)

Successful completion of Deployment SOST at a site results in the transfer of ownership of the system from the contractor to the FAA.

6.5.4 System Integration Phase

The site System Integration Phase begins when CAI is accomplished and concludes when the FAA declares Initial Operational Capability (IOC) for the system. During this phase, which is conducted by site and regional AT and AF personnel, all of the site's internal and external interfaces are established, operational procedures are evaluated, and training and familiarization occurs.

6.5.5 Field Familiarization Phase

The site Field Familiarization Phase extends from the IOC milestone through completion of the Operational Readiness Demonstration (ORD). During this interval, the site's technical and operational work forces and management personnel employ the new equipment in a carefully controlled operational environment to verify that the fully integrated system is fully functional. Use of the new system capabilities typically begins with use for limited periods during low traffic time periods, gradually increasing usage for longer periods under full traffic load conditions. During this time, site personnel develop and demonstrate full proficiency in the maintenance and operation of the newly configured operational system. AOS-400 and the contractor may serve in a support role.

Field familiarization will be accomplished using progressive confidence building processes. These will be defined in a separate testing document and will include but not be limited to:

- AF testing and certification
- Stand-alone system functionality and load testing
- System stress testing through various means such as track volume, radar input volume, controller entry volume, etc
- Validation of off-line processes by AT and AF personnel
- Off-line interfacility testing using simulation data to exercise routes and provide a data base for analysis
- Failure mode testing (entering and exiting a degraded mode) will be completed as a coordinated effort between AT and AF
- Live shadow testing using interfacility links to the host

During field familiarization, standard operating procedures and training will be evaluated to ensure that they are effective and workable under the new environment. Controllers and technicians will be briefed on transitioning from one ARTS to the other, its impact on the operational environment, and the procedures to be used to mitigate software functionality issues that may arise.

6.5.6 Dual Operations Phase - ARTS IIIE Only

The Dual Operations Phase follows completion of the ORD milestone through commissioning of the system for on-going operations and completion of the Joint Acceptance Inspection (JAI). Once the ARTS IIIE A6.05 system is commissioned. it becomes the primary operational system,

while the replaced equipment is maintained in a back-up mode. A pre-determined minimum number of personnel are certified on use of the system.

The existing ARTS IIIA/ARTS IIIE A6.04 equipment will be maintained in an operational ready state to support continuing air traffic operations in the event of a failure of the ARTS IIIE A6.05 hardware or software. A switchback is the planned transition from ARTS IIIE to the existing ARTS IIIA/ARTS IIIE A6.04, while a fallback is the unplanned transition from ARTS IIIE to the existing ARTS IIIA/ARTS IIIE A6.04 due to system failure. Usually, a switchback will be accomplished after scheduled periods of testing, whereas a fallback will begin with either Class II or III failure modes. However, each site may establish internal procedures. AT and AF specialists will assist in making fallback decisions by analyzing the failure (hardware and software) and recommending either repair and system restoral without adverse impact to air traffic operations or transfer to ARTS IIIA/ARTS IIIE A6.04 operations.

6.5.7 Equipment Removal Phase

The Equipment Removal Phase follows completion of the JAI milestone and extends until all excess or deactivated equipment, implementation support, and test equipment is removed and the facility is refurbished or restored. Included during this phase are all activities necessary to resolve outstanding program trouble reports and outstanding DRR checklist and JAI items. At the completion of this phase, implementation activities identified in site implementation plans will have been accomplished. A detailed description pertaining to the disposal of excess equipment activities, are provided in Appendix C, of the National Airspace Integrated Logistics Support Plan for the ARTS IIE.

7.0 STATUS ASSESSMENT

7.1 AF Operations

Specific information regarding maintenance impacts, systems maintenance, and procedural changes are provided in the ARTS IIIE ILSP dated July 18, 1994, Revision 1 dated March 10, 1995, and Revision 2 dated February 12, 1998. The ARTS IIE ILSP, dated March 26, 1998, provides specific information on the program.

7.2 AT Operations

The ARTS IIIE A6.05 and ARTS IIE A2.09 are replacing existing systems and will not require changes in AT Operations.

7.3 System Configuration and Engineering

The System Segment Specification/Hardware Requirements Specification (SSS/HRS) establishes the requirements for each of the Common ARTS HWCIs and its application to ARTS IIIE and/or ARTS IIE.

7.4 Physical Facilities

The ARTS IIE upgrade kit consists of a hardware modification of the system in the current position for the existing ARTS IIA systems. For this reason, there will not be any changes in the physical facility requirements.

ARTS IIIE will replace approximately ninety 19 inch equipment racks with three racks at Southern California TRACON, six to eight 19 inch equipment racks with one rack for each system at Chicago, Denver, New York, and Dallas/Ft. Worth. The hardware is installed at each of these facilities.

7.5 Financial Resources

Site preparation funding has been provided for ARTS IIE based on requests received from the regions. AUA-320 provided ARTS IIIE site preparation funding to Southern California, New York, Chicago, and Dallas/Ft. Worth. ANS-200 provided the Denver funding.

7.6 Human Resource Management

7.6.1 AF Training Issues

AFZ-100 coordinates AF training requirements. All ARTS IIIE training has been completed. ARTS IIE sites will have a minimum of three technicians trained prior to installation.

7.6.2 AT Training Issues

AT training will be provided through an ARTS IIE Computer Based Instruction (CBI) course and corresponding paper ware course. A leapfrog approach will be used to provide keyboards to each site at least 90 days prior to installation and remain through IOC. However, each site will need to ship the keyboard to the follow-on site according to the schedule for the plan to be effective for every location.

7.7 Test and Evaluation

Keysite testing has been completed. ATQ-3 completed an Independent Operational Test and Evaluation on ARTS IIE. Concerns and issues identified during testing have been addressed and corrected.

7.8 System Support

Technical manuals are completed and delivered for ARTS IIIE. Draft technical manuals are provided with each ARTS IIE system or upgrade, and the final version is scheduled to be available in July 1998.

7.9 Schedule

Lockheed Martin is scheduled to install six ARTS IIE Upgrade Kits each month, and the site adaptation must be completed prior to their installation. This is an aggressive site adaptation support schedule, but AOS-430 should be capable of meeting this schedule.

In addition to normal coordination, ANS-700 contacts the TOR approximately six months prior to scheduled installation to verify the site understands the requirements. AUA-330 also provides a Transition Plan to each facility about two months prior to installation to coordinate specific start times with a follow up teleconference about one month prior.

7.10 Administration

The Existing Products Product Team Plan identifies the roles and responsibilities of core team members and extended team members. Each organization participated in the development, review and coordination of the plan to ensure all administrative areas were sufficiently identified.

7.11 Implementation

The Terminal Automation Implementation Group schedules regular meetings to discuss issues and action items pertaining to the implementation of the ARTS IIIE and ARTS IIE programs. An action item data base was developed to document and track any issues identified during all meetings, teleconferences and field visits. Copies of this document are provided to each RAPM monthly.

APPENDIX A ACRONYMS AND ABBREVIATION LIST

Acronym	Definition	Page
AACU	Aural Alarm Control Unit	23
ADC	Azimuth Data Converter	57
AF	Airway Facilities	1
APC	Acquisition Processing Cabinet	8
APLNI	Associate Product Lead for NAS Implementation	45
APLTATI	the Associate Product Lead for Terminal Automation Transition and Implementation	45
ARSR-4	Air Route Surveillance Radar-4	18
ARTCC	Air Route Traffic Control Centers	4
ARTS	Automated Radar Terminal Systems	1
ASC	Acquisition Signal Conditioner	8
ASR	Airport Surveillance Radars	18
AT	Air Traffic	1
ATC	Air Traffic Control	13
ATCBI	Airport Traffic Control Beacon Interrogator	18
ATR	Acceptance Test Review	52
AUS	Automation Specialist	15
BANS	BRITE Alphanumberic System	22
C&S	Confidence and Stability	8
CA	Conflict Alert	26
CAI	Contractor Acceptance Inspection	2
CBI	Computer Based Instruction	2
CCB	Configuration Control Board	14
CDR	Continuous Data Recording	23
CDRES	Continuous Data Recording Editor Software	31
CDRL	Contract Data Requirements List	41
COTS	Commercial Off-The-Shelf	9
CP	Common Processing	34
CPC	Common I Processing Complex	22
CRT	Cathode Ray Tube	9
CSB	Code Select Box	26
CSCI	Computer Software Configuration Item	18
DA	DNIP Adapter	27
DADCP	Data Acquisition Device Control Processor	26
DASI	Digital Altimeter Setting Indicator	18
DBRITE	Digital Bright Radar Indicator Tower Equipment	8
DCP	Display Control Panel	55
DDAS	Decoding and Data Acquisition Subsystem	8
DDCP	Display Device Controller Processor	34
DDCPS	Display Device Controller Processor Software	31
DDU	Disk Drive Unit	7
DEDS	Data Entry and Display Subsystem	23

Acronym	Definition	Page
DNIP	Display Network Interface Processor	18
DOD	Department of Defense	47
DPS	Display Processing Software	30
DS/DP	Dual Sensor Dual Processor Configuration	28
DSOST	Deployment Site Operational System Test	6
EES	Engineering Environment Software	30
ETG	Enhanced Target Generator	17
F&E	Facility and Equipment	3
FAA	Federal Aviation Administration	1
FAALC	FAA Logistics Center	9
FCA	Functional Configuration Audit	14
FDAD	Full Digital ARTS Display	18
FDP	FDAD Display Processor	32
FIT	Field Implementation Team	45
FMA	Final Monitor Aid	19
FP	Flight Plan	17
GFE	Government Furnished Equipment	26
GFI	Government Furnished Information	47
GFP	Government Furnished Property	47
HAZMAT	Hazardous Materials	41
HDDD	Hardware Detailed Design Document	18
HOL	High Order Language	56
HRS	Hardware Requirements Specification	21
HSK	Heat Sink	56
HSP	High Speed Printer	23
HVAC	Heating, Ventilation and Air Conditioning	37
HWCI	Hardware Configuration Items	21
I/O	Input/Output	18
ICS	Interim Contractor Support	9
IFR	Instrument Flight Rules	37
ILSP	Integrated Logistic Support Plan	1
INCO	Installation and Checkout	2
IOA	Input/Output Adapter	23
IOC	Initial Operating Capability	2
IOPB	Input/Output Processor Modification B	7
IP	Internet Protocol	17
IPT	Integrated Product Team	1
ISR	In-Service Review	4
ISS	Implementation Support Specialist	45
JAI	Joint Acceptance Inspection	3
KDC	Keyboard Device Controller	23
LAN	Local Area Network	18
LBP	Local BANS Processor	22
LRU	Line Replaceable Units 9	

Acronym	Definition	Page
MAINT	Maintenance Software	30
MALA	Mode S/ASR-9 Line Adapter	57
MCI	Mode C Intruder	20
MCOTS	Mission Critical Off-The-Shelf Equipment	23
MCP	Micro Common Processor	7
MDBM	Multiplexed Display Buffer Memory	7
MSAW	Minimum Safe Altitude Warning	17
MSUPP	Mission Support Equipment	23
MTU	Magnetic Tape Unit	42
NAS	National Air Space	1
NATCA	National Air Traffic Controllers Association	16
NEWD	Newly Developed Equipment	23
OFFL	Off-Line Equipment	23
ORD	Operation readiness Demonstration	2
OT&E	Operational Test and Evaluation	14
PASS	Professional Airway Systems Specialists	11
PCA	Physical Configuration Audit	14
PD-PC	Performance Data - Personal Computer	19
PEM	Positional Entry Module	26
PIP	Program Implementation Plan	1
PPI	Plan Position Indicator	56
PROM	Programmable Read-Only Memory	24
PT	Product Team	1
QRO	Quality Reliability Officer	52
RADS	Radar Alphanumeric Display Subsystem	8
RAM	Random Access Memory	24
RAPM	Regional Associate Program Managers	45
RCB	Remote Control Box	26
RDBM	Remote Display Buffer Memories	24
RDM	Remote Display Multiplexed	22
RMM	Remote Maintenance Moniting	10
RSSS	Radar System Selector Switch	19
RTC	Reat Time Clock	19
RTDS	Remote Tower Display Subsystem	52
RTP	Regional Tracking Program	2
SADS	Site Adaptation Software	30
SAT	Site Acceptance Test	9
SCIP	Surveillance and Communications Processor	18
SCS	System Console Software	30
SDC	Stroke Display Controller	30
SDS	Software Development System	10
SDWS	Software Development Work Station	22
SE	Support Equipment	22
SG	Sensor Gateway	22

Acronym	Definition	Page
SIFS	Sensor Interface Software	30
SIP	Site Installation Plan	48
SMC	System Monitor Console	7
SMCC	System Monitoring Console Complex	22
SMCPCC	SMC Personal Computer Complex	22
SMO	System Management Office	10
SMON	System Monitoring Software	30
SOST	Site Operation System Test	10
SP	System Processor	18
SRAP	Sensor Receiver and Processor	18
SRS	Software Requirements Specification	30
SS/DP	Single Sensor Dual Processor Configuration	28
SS/SP	Single Sensor Configuration	28
SSIC	Subsystem Interface Complex	22
SSS	System Segment Specification	21
STARS	Standard Terminal Automation Replacement System	17
STD	Standard	23
TAIG	Terminal Automation Implemenation Group	45
TMS	Traffic Management System	18
TOR	Technical On-Site Representative	7
TP	Track Processing	34
TPC	Track Processing Complex	22
TPS	Track Processing Software	30
TRACAB	Terminal Radar Approach Control Tower Cabs	21
TRACON	Terminal Radar Approach Control	4
TRR	Test Readiness Review	51
TTY	Teletypewriter	20
UDP	User Datagram Protocol	17
UPS	Uninterruptible Power Supply	27
VAR	Video Amplifier-RADS	56
VME	Versa Module Eurocard	57
VTC	Video Time Compression	8
WJHTC	William J. Hughes Technical Center	1

APPENDIX B: ARTS IIE GENERIC SITE IMPLEMENTATION PLAN (GSIP)

Act. #	Activity	Duration	Respons. Org./Indiv	Due Date/ Schedule	Comments	PIP Para Ref
	PLANNING PHASE					
1	Identify the following for the region:	1 Day	AUA-330	Cont. Award	RAPM disseminate; ongoing	1.6.1
	Installation sites					
	Equipment delivery dates					
	Equipment installation dates					
2	Identify Regional and Site responsibilities for ARTS IIE implementation	2 Days	AUA-330	11/22/95	Provided in Installation Planning Report. Copies forwarded to RAPMs	Ch. 6
3	Publish Site Survey Checklist	45 Days	AUA-330	90 days < Site Survey	Completed. Copies provided to RAPMs	6.5.2.3
4	Develop a plan to track action items and issues	5 Days	AXX-4XX	< Site Survey		6.5.2.2
5	Identify site survey personnel (telephone site survey only)	5 Days	RAPM	< Site Survey		6.5.2.2
6	Identify site AF support personnel budget requirements for implementation	30 Days	RAPM	< Site Survey		Ch. 2, 6.5.2.2
7	Identify site AT support personnel budget requirements for implementation	30 Days	AXX-510	< Site Survey		3.3
8	Identify site access and badging requirements for delivery and testing personnel	5 Days	RAPM	< Site Survey		5.5
9	Initiate Implementation and Information (I&I) Brief with PASS and NATCA	30 Days	RAPM/ AXX-510	Site Survey		2.5, 3.4

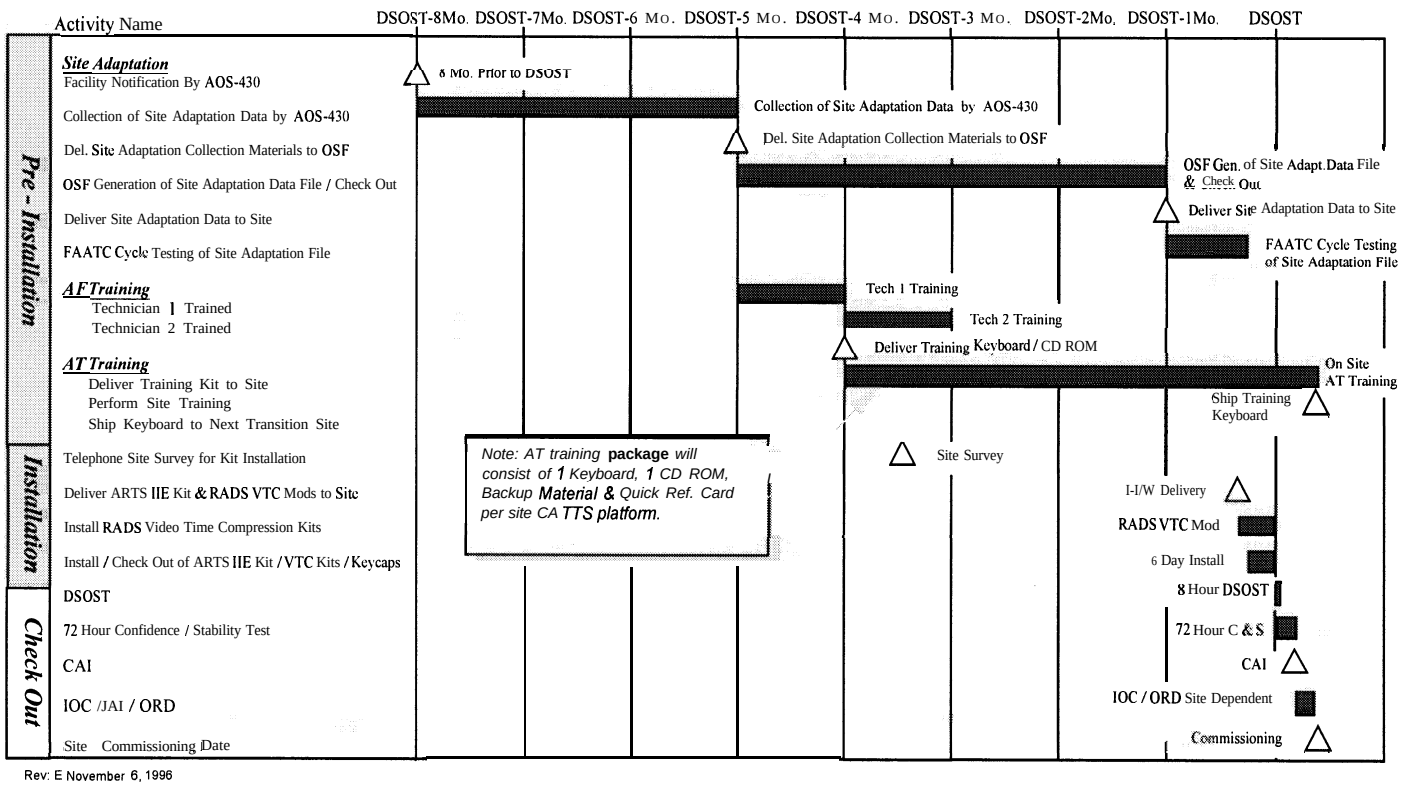
Act. #	Activity	Duration	Respons. Org./Indiv	Due Date/ Schedule	Comments	PIP Para Ref
10	Identify unique space requirements for installation	5 Days	RAPM	Site Survey		5.8.1.3
	Staging area (approx. 120 sq. ft.)					
	APC cabinet less than 50 ft. from modem rack					
11	Identify Telco requirements	5 Days	RAPM	< Site Survey		5.1
12	Coordinate Maintenance Training Course with AFZ-100	5 Days	RAPM	< Site Survey		2.6.2
13	Coordinate AT Training requirements with ARU-200	5 Days	AXX-510	< Site Survey		3.1.5
14	Develop Transition Plan	30 Days	RAPM	IOC		6.5
	SITE PREPARATION PHASE					
15	Provide contractor point of contact list	5 Days	RAPM	< Site Survey		6.5
	AF Coordinator					
	AT Site Coordinator					
	Site Security POC					
	Site Technical On-site Representative					
16	Complete site survey checklist	1 Day	TOR	90 days < install	Complete prior to coordination with Lockheed Martin	6.5.2.3
17	Coordinate site survey checklist with Lockheed Martin	1 Day	TOR	90 days < install		6.5.2.3
18	Determine support equipment and access requirements	3 Days	RAPM	Site Survey		6.5.2.3
	Delivery vehicle					
	Area around APC cabinet					
	Staging area (approx. 120 sq ft)					
19	Review power requirements	3 Days	TOR	Site Survey		5.4
	Power panel access					
	Testing requirements					
	Cutover procedures					

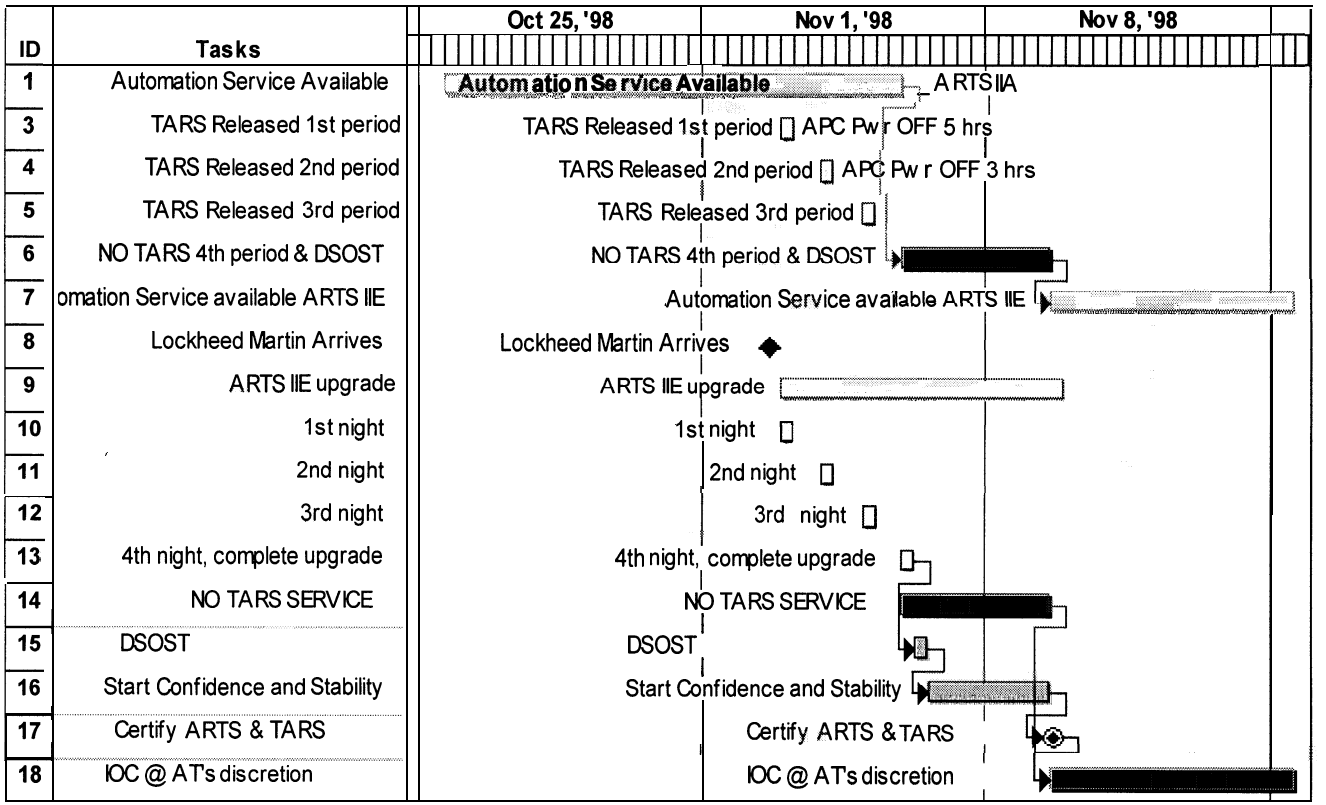
Act. #	Activity	Duration	Respons. Org./Indiv	Due Date/ Schedule	Comments	PIP Para Ref
20	Identify required cabling mods					6.5.2.3
	Convenience power outlets for contractor work					
	Dedicated operation circuit for SMC					
	Install contractor-furnished 4/0 cables and ground plates					
	Demarcation junction boxes					
21	Prepare SMC for installation					
22	Coordinate site adaptation parameters with AOS/OSF	5 Days	AXX-510	6 mos. < install		6.5.2.3
23	Identify contractor point of contact for delivery activities	1 Day	RAPM	Site Survey		6.5.2.3
24	Review HAZMAT requirements	1 Day	RAPM	Site Survey		5.6.1
25	Develop CAI Plan	30 Days	AUA-330	< Delivery		
26	Develop Site Installation Team Kickoff Agenda:	30 Days	RAPM	30 days < equip. delivery	Coordinate with AT and AF	
	Security passes/badges					
	Parking					
	Contractor clearance list with SSNs					
	Work day					
	In house contact list					
	Training schedule					
	Issue resolution & tracking					
27	Identify any LOAs or MOAs required or needing modification	30 Days	RAPM/ AXX-510	30 days < equip. delivery		
28	Coordinate CAI Plan	30 Days	RAPM	< CAI		6.5
	INCO PHASE					
29	Establish the JAI Board	3 Days	SMO	< ORD	Chaired by AF SMO representative	6.5
30	Install DBRITE key caps	1 Hour	AF Tech	< ARTS IIE kit installation is completed		
31	Oversee hardware delivery	4 Hours	TOR	During delivery		6.5
32	Develop AT training schedule	2 Hours	AXX-510	30 days < CAI		3.1.5

Act. #	Activity	Duration	Respons. Org./Indiv	Due Date/ Schedule	Comments	PIP Para Ref
33	Update AF system certification procedures	15 Days	AOS-400	CAI		2.2
34	Conduct the Contractor Acceptance Inspection (CAT)	1 Days	AUA-330	CAI		6.5
35	Update AF personnel certifications for new equipment	5 Days	SMO	< IOC		2.2
36	Complete deployment SOST according to Site Acceptance Test Plan, CDRL T003					
37	Determine disposition of replaced equipment	1 Day	SMO	< Equipment removal		
38	Finalize FRDF	15 Days	AXX-450	Commissioning		6.5
	SYSTEM INTEGRATION PHASE					
39	Complete AF training	90 Days	RAPM	< IOC		2.6.2
40	Complete AT training	30 Days	AXX-510	< IOC		3.3
41	Review AT/AF operational procedures	2 Days	AT/AF	IOC		2.2, 3.1.2
42	Close out any outstanding INCO discrepancies	30 Days	RAPM	IOC		6.5.3.7
43	Monitor system integration testing	4 Days	AOS/ACT AUA	IOC		6.5.5
44	Conduct AF familiarization training	30 Days	SMO	IOC		2.4
45	Declare IOC	1 Day	SMO/AT	IOC		6.5.4
	FIELD SHAKEDOWN PHASE					
46	Identify funding to complete equipment removal	2 Days	RAPM	6 mos. < ORD		6.5.7
47	Validate operational procedures	1 Day	SMO/AT	ORD		6.5.5
48	Conduct JAI using the JAI checklist	1 Day	SMO	ORD		6.5
49	Conduct commissioning procedures	1 Day	SMO	ORD		6.5.5
	DUAL OPS PHASE (n/a)					
	EQUIPMENT REMOVAL					
50	Remove the replaced equipment	1 Day	AXX-400	> Decomm		6.5.7

APPENDIX C: ARTS IIE UPGRADE KIT SITE IMPLEMENTATION

ARTS IIE Upgrade Kit Site Implementation




Oct 25, '98
Nov 1, '98
Nov 8, '98
ID
Tasks
1 Automation Service Available
3 TARS Released 1st period
4 TARS Released 2nd period
5 TARS Released 3rd period
6 NO TARS 4th period & DSOST
7 omation Service available ARTS IIE
8 Lockheed Martin Arrives
9 ARTS IIE upgrade
10 1st night
11 2nd night
12 3rd night
13 4th night, complete upgrade
14 NO TARS SERVICE
15 DSOST
16 Start Confidence and Stability
17 Certify ARTS & TARS
18 IOC @ AT's discretion
Automation Service Available
ARTS IIA
TARS Released 1st period
APC Pwr OFF 5 hrs
TARS Released 2nd period
APC Pwr OFF 3 hrs
TARS Released 3rd period
NO TARS 4th period & DSOST
Automation Service available ARTS IIE
Lockheed Martin Arrives
ARTS IIE upgrade
1st night
2nd night
3rd night
4th night, complete upgrade
NO TARS SERVICE
DSOST
Start Confidence and Stability
Certify ARTS & TARS
IOC @ AT's discretion

APPENDIX D: ARTS IIE DELIVERY SCHEDULE

IIE SEQ	Region	LID	Location	IIE HARDWARE INSTALL	IIE DSOST	OSF	DBRITE DSCs	COMMENTS
1	DP	DP1	Loral 1(VFEC)		*			
2	DP	DP2	Loral 2 (EAGAN)		*			
3	CT	TC2	**FAATC 2 (System)		10/01/96			Completed, Option 6/DS/DP
4	CT	TC3	*FAATC 3 (System)		10/01/96			Completed, Option 6/DS/DP
5	CT	TC1	FAATC 1		04/07/97			Completed as Upgrade Demo 4/11/97
6	LC	LC1	FAALC (OPS) (System)		04/21/97			Completed, Option 6
7	ASW	FSM	Fort Smith, AR (System)		05/12/97	DFW	1	Completed, Test Site, DS/DP, LC2
8	ASW	FYV	Fayetteville, AR (System)		05/12/97	DFW	1	Completed, Test Site, DS/DP, BSM,58NM
9	AC	AC1	FAA Academy 1		05/19/97			Completed
10	AC	AC2	*FAA Academy 2		08/11/97		1	Completed
11	AWP	LC6	Test asset @ Stockton		12/01/97			Relo - Formerly Loring AFB
12	LC	LC2	FAALC F&E 2 (System)		*			From FSM, Option 6
13	ASO	PPP	*Pensacola, FL	12/03/97	12/08/97	ORD	0	ARTS IIE Keysite, Hardware installed 9/30/97, DS/DP

IIE SEQ	Region	LID	Location	IIE HARDWARE INSTALL	IIE DSOST	OSF	DBRITE DSCs	COMMENTS
14	AEA	ACY	Atlantic City, NJ	02/06/98	2/11/98	DEN	1	ARTS IIE Keysite, SS/SP
15	ASO	PNS	**Pensacola, FL	03/29/98	04/03/98	ORD	6	ARTS IIE Keysite, DS/DP
16	ASW	ROW	Roswell, NM (System)	02/09/98	04/17/98	DFW	1	Option 6, 4 new RADS + 1 from Waco
17	AEA	RDG	Reading, PA	04/20/98	04/25/98	DEN	3	TRACAB, 3 DBRITES
18	AGL	MSN	Madison, WI	05/05/98	05/10/98	ORD	1	
19	AGL	MKG	Muskegon, MI	05/12/98	05/17/98	SCT	1	
20	ANE	BTV	Burlington, VT	05/10/98	05/15/98	NYC	1	
21	ASO	CAE	Columbia, SC	05/31/98	06/05/98	ORD	2	
22	AWP	SCK	**Stockton, CA	06/14/98	06/19/98	SCT	3	SS/SP
23	AWP	MER	*Castle AFB, CA	06/14/98	06/19/98	SCT	*	SS/SP
24	ASW	BSM	**New Austin-Bergstrom, TX	02/17/98	07/10/98	DFW	2	From FYV, SS/DP, Option 6
25	AEA	ROA	Roanoke, VA **	07/19/98	07/24/98	DEN	1	
26	ASW	AUS	*Austin-Mueller, TX	07/21/98	07/25/98	DFW	2	SS/DP
27	AEA	LYH	Lynchburg, VA* (System)	08/02/98	08/07/98	DEN	1	Option 2, 4 new RADS
28	ACE	ICT	Wichita, KS	08/17/98	08/21/98	DEN	2	MS in IBI
29	ANE	BGR	Bangor, ME	08/28/98	08/31/98	SCT	1	

IIE SEQ	Region	LID	Location	IIE HARDWARE INSTALL	IIE DSOST	OSF	DBRITE DSCs	COMMENTS
30	AGL	AZO	Kalamazoo, MI	09/08/98	09/11/98	ORD	1	
31	ACE	LNK	Lincoln, NE	09/08/98	09/11/98	DEN	1	
32	ANM	BOI	Boise, ID	09/21/98	09/25/98	SCT	1	
33	ANE	MHT	Manchester, NH	09/11/98	09/14/98	NYC	2	
34	ASW	BTR	Baton Rouge, LA	09/21/98	09/25/98	DFW	1	
35	AAL	ANC	**Anchorage, AK	09/26/98	10/01/98	ORD	5	SS/DP
36	AAL	ANCA	*Anchorage, AK	10/06/98	10/11/98	ORD	*	SS/DP
37	ASO	PBI	West Palm Beach, FL	09/28/98	10/02/98	DEN	1	
38	AAL	FAI	Fairbanks, AK	10/15/98	10/20/98	ORD	4	
39	AWP	RNO	Reno, NV	10/19/98	10/23/98	SCT	1	
40	ASW	LCH	Lake Charles, LA	10/19/98	10/23/98	DFW	1	
41	AGL	GRR	Grand Rapids, MI	11/02/98	11/06/98	ORD	1	
42	AEA	ADW	Andrews AFB, MD	11/02/98	11/06/98	SCT	1	
43	ASO	HSV	Huntsville, AL	11/02/98	11/06/98	DFW	3	2 DSCs for Redstone
44	AGL	SPI	Springfield, IL	11/16/98	11/20/98	ORD	1	
45	ASW	MLU	Monroe, LA	11/16/98	11/20/98	DFW	2	2nd DSC left from conversion of TRACAB to TRACON
46	ASO	DAB	Daytona Beach, FL	11/16/98	11/20/98	DFW	2	

IIE SEQ	Region	LID	Location	IIE HARDWARE INSTALL	IIE DSOST	OSF	DBRITE DSCs	COMMENTS
47	AGL	PIA	Peoria, IL	11/30/98	12/04/98	ORD	1	58 nm requirement
48	ASW	LFT	Lafayette, LA	11/30/98	12/04/98	DFW	2	
49	AEA	ERI	Erie, PA	12/14/98	12/18/98	SCT	1	
50	AGL	MLI	Moline, IL	12/14/98	12/18/98	ORD	1	
51	ANE	ACK	**Nantucket, MA (Cape)	11/30/98	12/04/98	NYC	1	
52	ASW	LIT	Little Rock, AR	01/04/99	01/08/99	DFW	1	
53	AWP	FAT	Fresno, CA	01/04/99	01/08/99	SCT	1	
54	ANE	FMH	*Falmouth, MA (Cape)	12/14/98	12/18/98	NYC	2	
55	ASW	ABI	Abilene, TX	01/18/99	01/22/99	DFW	2	
56	AGL	CAK	Akron-Canton, OH	01/18/99	01/22/99	ORD	1	
57	ANM	MWH	Moses Lake, WA	07/27/99	08/01/99	SCT	1	
58	ASO	GSO	Greensboro, NC	01/04/99	01/08/99	DEN	2	9 DDCPs
59	ASW	MAF	**Midland, TX	01/27/99	02/01/99	DFW	1	
60	AGL	GRB	Green Bay, WI	01/27/99	02/01/99	ORD	2	Appleton a satellite, 58 nm requirement
61	ASW	SJT	*San Angelo, TX	02/10/99	02/15/99	DFW	1	
62	AEA	CRW	Charleston, WV	01/27/99	02/01/99	NYT	1	
63	AWP	MRY	Monterey, CA	02/10/99	02/15/99	SCT	2	ASR-8 @ Ft Ord
64	ASW	AMA	Amarillo, TX	02/24/99	03/01/99	DFW	1	
65	ASO	MGM	Montgomery, AL	02/10/99	02/15/99	DFW	2	Rdr @ Maxwell AFB (MXF)

IIE SEQ	Region	LID	Location	IIE HARDWARE INSTALL	IIE DSOST	OSF	DBRITE DSCs	COMMENTS
66	AWP	PSP	Palm Springs, CA	02/24/99	03/01/99	SCT	2	
67	ACE	CID	Cedar Rapids, IA	02/24/99	03/01/99	DEN	1	
68	ASW	LBB	Lubbock, TX	03/10/99	03/15/99	DFW	2	
69	AEA	ABE	Allentown, PA	03/10/99	03/15/99	SCT	1	
70	ASO	CHA	Chattanooga,TN	03/10/99	03/15/99	NYC	1	
71	ASW	GGG	Longview, TX	03/27/99	04/01/99	DFW	2	58 nm requirement
72	AEA	RME	Griffis AFB, NY	03/27/99	04/01/99	SCT	2	
73	ASO	TYS	Knoxville, TN	03/27/99	04/01/99	ORD	1	
74	AWP	BFL	Bakersfield,CA	04/10/99	04/15/99	SCT	1	
75	AEA	MDT	Harrisburg, PA	04/10/99	04/15/99	NYC	3	
76	ANM	EUG	**Eugene, OR	01/10/00	01/15/00	DEN	1	
77	ASO	AGS	Augusta, GA	04/26/99	05/01/99	DEN	1	BI5 installed by IIE date, 58 nm req
78	AWP	SBA	Santa Barbara, CA	04/26/99	05/01/99	SCT	1	AIU
79	ANM	MFR	*Medford, OR	01/27/00	02/01/00	DEN	1	
80	ASO	TLH	Tallahassee, FL	05/10/99	05/15/99	DFW	1	MS installed by IIE date
81	AEA	RIC	**Richmond, VA	05/10/99	05/15/99	SCT	2	
82	ACE	SGF	**Springfield, MO	05/10/99	05/15/99	DEN	1	58 nm requirement
83	ASW	FSM	**Fort Smith, AR	05/27/99	06/01/99	DFW	1	SS/SP
84	AEA	CHO	*Charlottesville,	05/27/99	06/01/99	SCT	*	

IIE SEQ	Region	LID	Location	IIE HARDWARE INSTALL	IIE DSOST	OSF	DBRITE DSCs	COMMENTS
			VA					
85	ACE	COU	*Columbia, MO	05/27/99	06/01/99	DEN	0	Option 2, 3 new RADS, 58 nm requirement
86	ASO	SAV	Savannah, GA	06/10/99	06/15/99	ORD	3	
87	ASW	FYV	*Fayetteville, AR	06/10/99	06/15/99	DFW	1	SS/SP, 58 nm requirement
88	ANM	BIL	Billings, MT	06/10/99	06/15/99	DEN	1	
89	ASO	FMY	Fort Myers, FL	06/26/99	07/01/99	ORD	2	Rdr LID RSW
90	ASW	CRP	**Corpus Christi, TX	06/26/99	07/01/99	DFW	2	58 nm requirement
91	AEA	BGM	Binghamton, NY	06/26/99	07/01/99	SCT	1	
92	AGL	RFD	Rockford, IL	07/10/99	07/15/99	ORD	1	
93	ACE	SUX	Sioux City, I A	07/10/99	07/1 5/99	ORD	1	
94	ASW	HRL	*Valley, TX/ Harlingen	07/10/99	07/15/99	DFW	3	58 nm requirement
95	AEA	ELM	Elmira, NY	07/27/99	08/01/99	SCT	3	
96	ANM	GTF	Great Falls, MT	07/27/99	08/01/99	DEN	3	
97	AGL	FSD	Sioux Falls, SD	07/27/99	08/01/99	ORD	1	
98	ASO	FAY	Fayetteville, NC	08/10/99	08/15/99	ORD	4	
99	ANM	COS	Colorado Springs, CO	08/10/99	08/15/99	DEN	5	
100	AEA	CKB	Clarksburg, WV	08/10/99	08/15/99	NYC	1	
101	ASO	LEX	Lexington, KY	08/27/99	09/01/99	SCT	1	
102	ANE	PWM	Portland, ME	08/27/99	09/0 1/99	SCT	1	Rdr @ Cumberland (CUM)
103	AGL	FAR	Fargo, ND	08/27/99	09/01/99	DEN	1	

IIE SEQ	Region	LID	Location	IIE HARDWARE INSTALL	IIE DSOST	OSF	DBRITE DSCs	COMMENTS
104	AEA	HTS	Huntington, WV	09/10/99	09/15/99	NYC	1	
105	ANM	PUB	Pueblo, CO	09/10/99	09/15/99	DEN	3	
106	AGL	HUF	Terre Haute, IN	09/10/99	09/15/99	ORD	1	
107	ASO	MOB	Mobile, AL	09/26/99	10/01/99	DFW	1	
108	ACE	ALO	Waterloo, IA	09/26/99	10/01/99	SCT	1	
109	AGL	FNT	Flint, MI	02/10/00	02/15/00	ORD	1	
110	ASO	MCN	Macon, GA	10/10/99	10/15/99	NYC	2	Rdr @ Robbins AFB (WRB) MS installed by IIE date
111	ANM	YKM	**Yakima, WA	10/10/99	10/15/99	SCT	1	58 nm requirement
112	AGL	YNG	Youngstown, OH	10/10/99	10/15/99	ORD	1	
113	ASO	GSP	Greer-Spartensburg, SC	10/27/99	11/01/99	NYC	2	58 nm requirement
114	ANM	PSC	*Pasco, WA	10/27/99	11/01/99	SCT	1	58 nm requirement
115	AGL	FWA	Fort Wayne, IN	10/27/99	11/01/99	DFW	1	
116	ASO	CSG	Columbus, GA	11/10/99	11/15/99	DEN	3	
			TBD	11/10/99	11/15/99			
117	AGL	CMI	Champaign/ Urbana, IL	11/10/99	11/15/99	ORD	1	
118	ASO	TRI	Bristol, TN (Tri-City)	11/26/99	12/01/99	DFW	1	
119	ANM	ASE	Aspen, CO	09/10/99	09/1 5/99	DEN	3	BOS
120	AGL	EVV	Evansville, IN	11/26/99	12/01/99	SCT	1	
121	ASO	GPT	Gulfport, MS	12/10/99	12/15/99	DFW	2	
122	AEA	AVP	Wilkes-Barre	12/10/99	12/15/99	NYT	1	Rdr @ Suscon (AVP)

IIE SEQ	Region	LID	Location	IIE HARDWARE INSTALL	IIE DSOST	OSF	DBRITE DSCs	COMMENTS
123	AGL	MFD	Scranton, PA Mansfield, OH	12/10/99	12/15/99	ORD	1	
124	ASO	JAN	Jackson, MS	12/27/99	01/01/00	DFW	1	
125	ANM	CPR	Casper, WY	12/27/99	01/01/00	DEN	1	
126	AGL	SBN	South Bend, IN	12/27/99	01/01/00	ORD	1	
127	AGL	LAN	Lansing, MI	01/10/00	01/15/00	DEN	1	
128	ANM	GEG	**Spokane, WA	04/10/99	04/15/99	SCT	4	
129	ASO	ILM	Wilmington, NC	01/10/00	01/15/00	ORD	1	
130	ANM	MSO	*Missoula, MT	04/26/99	05/01/99	SCT	1	
131	ASO	CHS	Charleston, SC	01/27/00	02/01/00	NYC	1	
132	AGL	RST	Rochester, MN	01/27/00	02/01/00	NYT	3	TRACAB, 3 DBRITES
133	ASO	NMM	Meridian, MS	02/10/00	02/15/00	DFW	1	
134	AWP	ITO	Hilo, HI	02/10/00	02/15/00	SCT	3	TRACAB, 3 DBRITES
135	AGL	MBS	Saginaw, MI	07/10/99	07/15/99	ORD	1	ASR-7 @ Freeland
136	ASO	AVL	Asheville, NC	02/25/00	03/01/00	SCT	1	
137	ASW/ DOD	GRK	Robert Gray AAF, Fort Hood, TX	02/25/00	03/01/00	DFW	1	
138	AGL	TOL	Toledo, OH	02/25/00	03/01/00	ORD	1	
139	AGL	BIS	Bismark, ND	03/10/00	03/15/00	SCT	3	TRACAB, 3 DBRITES
140	ASW/ DOD	FSI	Fort Sill, Henry Post AAF, OK	03/10/00	03/15/00	DEN	2	
141	ASO	FLO	Florence, SC	03/10/00	03/15/00	DFW	1	
142	ASO	MYR	Myrtle Beach, SC	03/27/00	04/01/00	DFW	1	

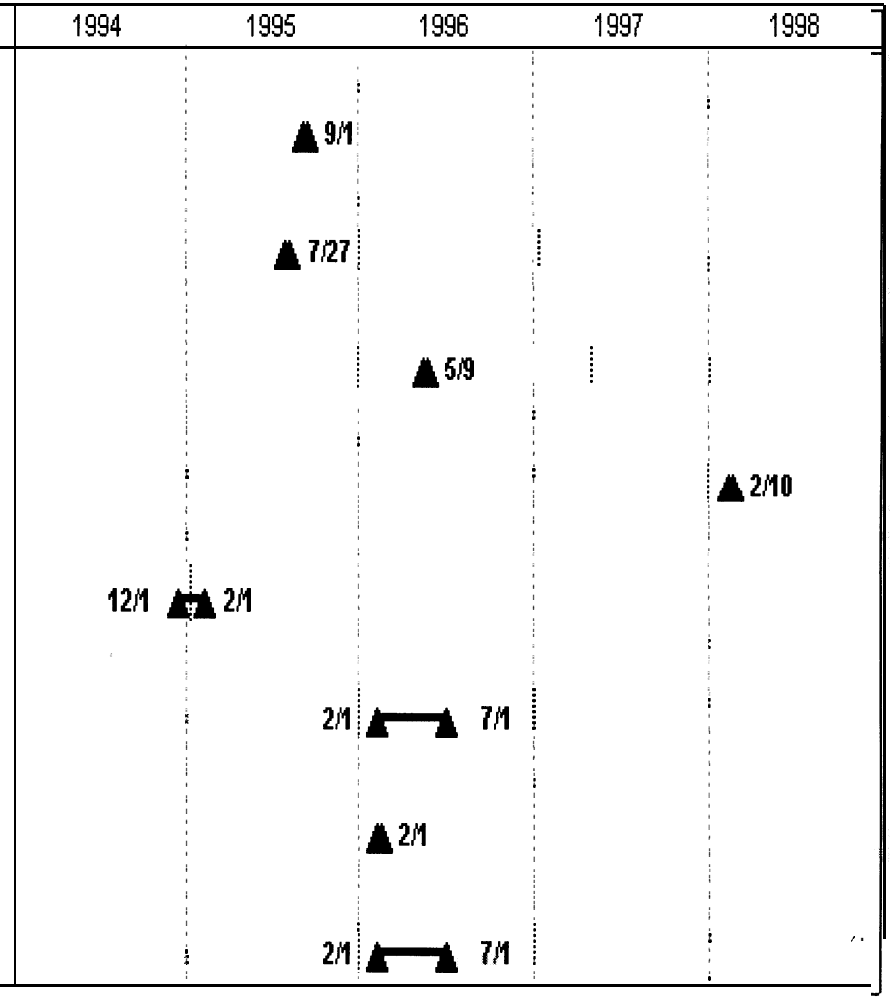
IIE SEQ	Region	LID	Location	IIE HARDWARE INSTALL	IIE DSOST	OSF	DBRITE DSCs	COMMENTS
143	ASW	ACT	Waco, TX	03/27/00	04/01/00	DFW	1	58 nm requirement, New RADS shipped from Roswell to Waco
144	AGL	DLH	Duluth, MN	03/27/00	04/01/00	SCT	1	
145	ASW	BPT	Beaumont, TX	04/10/00	04/15/00		1	
146			TBD	04/10/00	04/15/00			
147	CT	TC0	FAATC	04/10/00	04/15/00		2	
148	AC	AC3	FAA Academy 3	04/26/00	05/01/00		6	DBRITEs Only
149	AC	AC4	FAA Academy 4 (System)	04/26/00	05/01/00		1	Option 6
150	LC	LC3	FAALC HOT SYSTEM (KIT)	04/26/00	05/01/00		*	
151	LC	LC5	FAALC F&E SYSTEM (KIT)	05/10/00	05/15/00		1	

APPENDIX E: ARTS IIIE INSTALLATION SCHEDULE

Location	Hardware Installed	DSOST Start
Southern California TRACON*	May 1996	December 8. 1997
Chicago TRACON	August 1996	March 23, 1998
New York TRACON	April 1997	May 4, 1998
Dallas/Ft. Worth TRACON	March 1997	May 28, 1998
Denver	February 1998	May 27, 1998
	*Keysite Location	

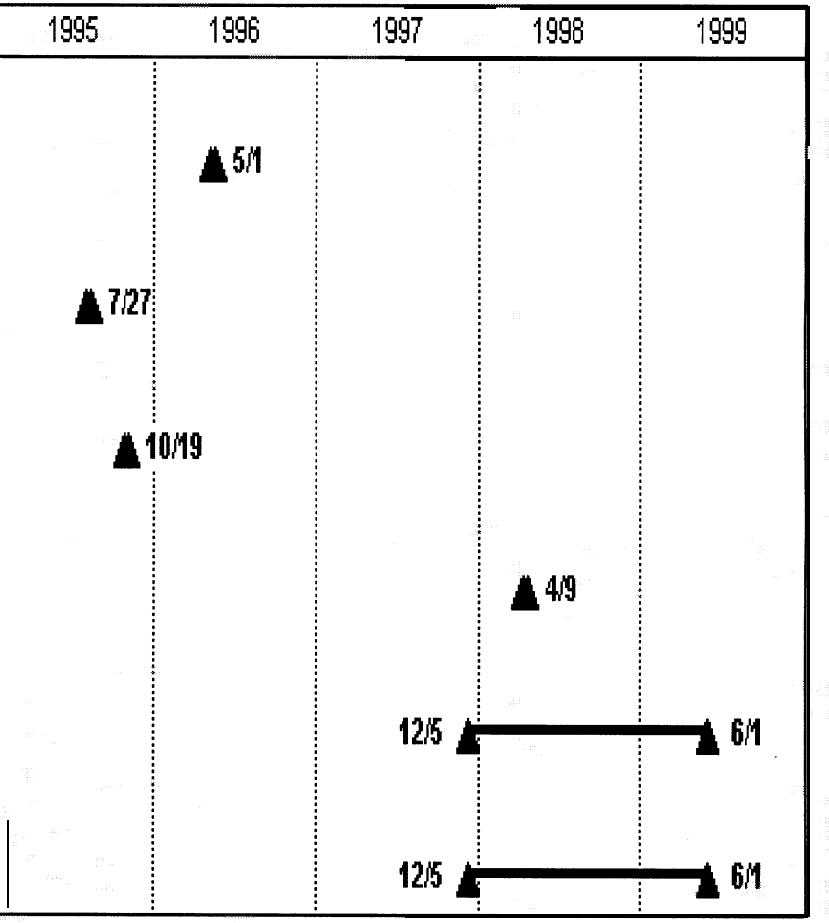
APPENDIX F: ARTS IIIE MILESTONES

milestones	Start	Finish
Contract Award	9/1/95	9/1/95
Critical Design Review(hardware)	7/27/95	7/27/95
Critical Design Review(software)	5/9/96	5/9/96
In-Service Decision	2/10/98	2/10/98
First /Last Site Delivery (hardware)A6.04	12/1/94	2/1/95
First/Last Site Delivery (software) A6.04	2/1/96	7/1/96
First/Last site Delivery (hardware) A6.05	2/1/96	2/1/96
First/Last Site Delivery (software) A6.05	2/1/96	7/1/96



APPENDIX G: ARTS II≤ MIL≤STONES

milestones	Start	Finish
Citract Award	5/1/96	5/1/96
Cical Design Review(hardware)	7/27/95	7/27/95
Cical Design Review(software)	10/19/95	10/19/95
Inervice Decision	4/9/98	4/9/98
Fit /Last Site Delivery (hardware)	12/5/97	6/1/99
Fit/Last Site Delivery (software)	12/5/97	6/1/99



U.S. Department
of Transportation

**Federal Aviation
Administration**

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